DEALERSHIP E-COMMERCE PACKAGE (E-PAYMENT SYSTEM)

Ooi Chon Hui

WET 990004

DEALERSHIP E-COMMERCE PACKAGE
(E-PAYMENT SYSTEM)

Submitted by
OOI CHON HUI
WET 990004

Under The Supervision Of
Pn. Miss Laiha Mat Kiah

Moderator
En. Ibrahim Abu Bakar

Faculty of Computer Science and
Information Technology
University Malaya
2001/2002

ABSTRACT

The purpose of this project is to carry out a critical research and to gather all the relevant information regarding a specific e-payment system. Appropriately, the detail information will simultaneously cover the protocol that has been used by the specific e-payment system. Hence, this project will focus on an electronic payment protocol named Secure Electronic Transaction or SET and it shall emphasize particularly on the security aspect provided by the above mention protocol.

The result from the research will be presented in an Internet to provide a comprehensive and thought information on the subject. This Dealership E-Commerce Package wills allows users who know nothing about the e-payment system to understand how actually online transactions occur. In this respect, the user will also get a better understanding about this e-payment system especially about all the processes that are look place before the transactions. Finally, they will also be acknowledged on the security provided by SET and thus can confide them to feel secure when using their credit payment facility over the Internet.

The successful of this e-payment system development will widen the usage of the formal online system and produce an intelligent of electronic payment application that will expose the electronic payment possibility for the future trend.

ACKNOWLEDGEMENT

First of all, I would like to express my deepest gratitude to my supervisor, Puan Miss Laiha Mat Kiah, for her continuous guidance, insight and encouragement throughout the entire project.

My warmest thank also to each group members, Miss Lee Siang Schee, Miss Hew Suh Jeng and Miss Ong Yeng Horng for their cooperation of making this project a success. Besides that, special thanks also the other fellow coursemates for sharing their knowledge and idea throughout the duration of the project.

Finally, I would like to thanks to my moderator Mr.Ibrahim Abu Bakar for her gentle help, comment and suggestion.

TABLE OF CONTENTS

Chapter 3: SYSTEM ANALYSIS AND METHODOLOGY

LIST OF FIGURES

LIST OF TABLES

Chapter 1

INTRODUCTION

Chapter 1: INTRODUCTION

1.1 E-Commerce Overview

E-commerce is forcing traditional offline companies to transform into e-business or else they risk losing market share to competitors, including fast-moving Internet start-ups. Business-to-business e-commerce is growing exponentially. By one estimate, business–to-business transaction could reach $1 trillion by 2004. Manufacturers, service companies and wholesalers that sell their products to other business are finding tremendous success online. Established companies that delay shifting to e-commerce risk losing market share to fast-moving Internet start-up companies.

E-commerce is also creating opportunities for many new types of business. People are turning their hobbies into profitable business on the web. There are companies that do not even have a product. This company is simply an affiliate of many online retailers. Here is how it works. These companies sign up with online merchants to be an affiliate, thus earning referral fees each time a client clicks from their web site. To the merchant's site and makes a purchase. Clients sign up to become members. Each member is given an email address of that company. These companies use the purchase information to referral fees it earns from its affiliates on to the individual client.

To conduct e-commerce, merchants need to organize an online catalog of products, take order through their web sites, accept payments in a secure environment, send merchandise to clients and manage client data (such as client profiles). They must also market their sites to potential clients.

Although the term e-commerce is fairly new, large corporations have been conducting e-commerce for decades, by networking system together with those of business partners and clients. For example, the banking industry uses *Electronic Funds Transfer (EFT)* to transfer money between accounts. Many companies also use *Electronic Data Interchange*

(EDI), in which business forms, such as purchase orders and invoices, are standardized so that companies can share information with clients, vendors and business partners electronically.

Until recently, e-commerce was feasible only for large companies. The Internet and the World Wide Web make it possible for even small business to complete with large companies. E-commerce allows companies to conduct business 24 hours a day, seven days a week, worldwide.

1.2 Project Overview

The Dealership E-Commerce Package is an e-commerce that provides dealer a full e-commerce Web site that complete with store back office, database, and payment system. Dealers who sign in for be a member can sell their own product beside our package. The project will divide into four modules, which is Online Inventory Control System, Configurable Web-Site Template, Online Shopping Cart and Ordering System, and E-Payment System. Each module will be fully in charge by each group members and I will be focus on E-payment System.

This project involve 3 parties:

1. Dealership E-Commerce Package
2. Corporate dealers / E-agent and
3. Customers.

Dealership E-Commerce Package is an online company that provides e-commerce Web site for dealer. It has many dealers in all over Malaysia. Dealers / E-agent is person between customer and the corporate who sell corporate products to customers. Dealers also sell their own products. Customers are person who visits dealer's web site to view or buy products from dealers.

Our dealership e-commerce packages are included:

- Order of products through on-line form
- Online purchase
- User-friendly ordering
- E-shopping with medium-sized catalog of items (20 – 50 items)
- Credit card processing
- Online check processing
- Pay by cash
- Secure server
- Easy add or edit for web template design

For the dealers, this web site enable dealers easy to set up their own e-commerce web site by just a few mouse click. This is different with the others e-commerce web site because our project not just emphasis online shopping, online ordering and online payment. Dealer can choose whatever dynamic web site templates their like. They also are provided a service to edit, add and delete the pages in the templates that given by our company. These services can be get from the dealer's store back office when the dealer accessing to the Internet through their use-friendly store back office administrator.

This project also will keep trace of the record of transaction between dealers and customer. They also can update the database easily. Dealers can upload their own product in this web site beside our company product. Dealers can do the e-payment system within the customer with the service provide by our web site.

For the customer, they can do the online shopping, online ordering, and online payment in the dealer's web site. They can browse the product; select the location and dealer through the web site. They must be a member of the dealer's web site before purchase any products. They can check out their order details through the web site. The electronic payment is secure, so they can do the payment through the Internet. See figure 1.1 the overview of the Dealership E-Commerce Package.

The electronic payment system is designed to provide immediate gratification of the wants of customers by allowing them to purchase goods, as services as credit. In an e-payment transaction within the dealer and customer, the dealers validate the customer's signature by matching the one on the back of the payment against the one on the charge slip. Settlement is handled by merchant's bank. The dealer receives immediate confirmation of a transaction while submitting it for authorization through the merchant's bank private data network.

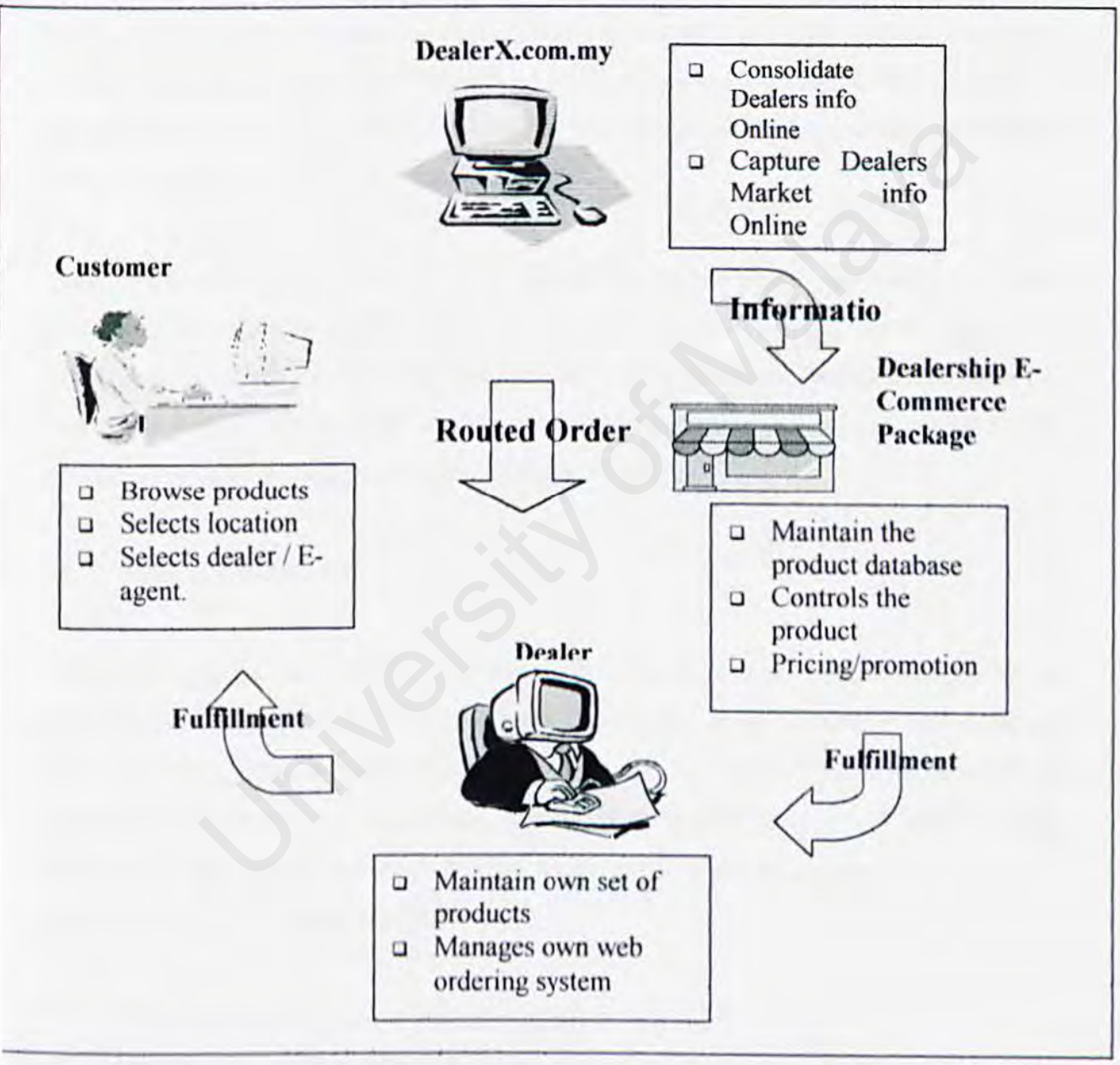


Figure 1.1 The Overview Of The Dealership E-Commerce Package

1.3 Project motivation

The growth of the internet as a valuable channel in human lifestyle today encourage people to optimize it usage for use on it. These enable user to access the Internet at anytime, anywhere connectivity through modem and other computer devices. The increasing popularity of the e-commerce in recent year because of it easy and useful explorer to explore the Internet by mouse click.

The main benefit of this project is easy, fast and secure access to relevant love interactive Internet information and other. E-Commerce based services are global, easy to explorer and are independent of the other e-commerce web site. It provides up-to date-information when you are on the move.

E-commerce services also has a user-friendly and easy of use design that enable user to get some important information through the computer screen in the most simple way. With this feature, the user can get use of the services and applications similar to the ones you find in the Internet in a very thin customer. The administration part also can easily handle the system as what they did in the normal Internet services.

1.4 Project Objective

The ultimate purpose of this project is none other than to have an understanding of the e-payment architecture and how the communication of the dealer, customer and merchant bank and then ascertains whether it is truly possible for such performance as what we found on the Internet now. In pursuing this undertaking, this project will aim to expose possibilities and perhaps even predict some future trends of the e-commerce.
The project main objectives would be:

- Provide a useful payment system to the customer.
- Provide a reliable and flexible system that serves the purpose of e-payment system on the move through Internet.

- Provide simple but intelligent e-payment system.
- Provide a simple and easy to understand e-payment system that let customer to involve in.
- Provide a convenience, accessibility and quality interaction for the customer and dealers.

1.5 Statement of Problem

There are some limitations for the Dealership E-Commerce Package (E-Payment System):

- The e-payment system needs security to protect the all transaction in the Internet. The security of this system contains many process and hard to understand it.
- Unable to find a simulation banking for transaction over the Internet.

1.6 Project Scope

The e-payment system is designed to provide immediate gratification of the wants of customers by allowing them to purchase goods or services on credit. The e-payment system provides two methods of payment, one is by credit card and another one is by online check. Customer can choose either credit card or online check as their payment method.

How the e-payment system work

1. The customer access the dealer's homepage via an Internet browser which is installed with a proxy program and shop for goods and choose the method of shipping.
2. The customer selects goods to buy and fill in a personal particulars form before paying.
3. The dealer processes the form and log customer's transaction into the database.

4. The dealer will then encrypt selected customer transaction information and redirect the customer to the simulation merchant bank together with the encrypted information.
5. The simulation merchant bank will authenticate the customer's transaction data and process the payment transaction.
6. Finally, the simulation merchant bank will send a message to notify dealer if payment transaction is successful.

Considering that the scope of this project is indeed wide, the implementation of a complete e-payment system would require a significant amount of time and manpower. Therefore, in the case of this project, the e-payment system would be restricted to a certain extent in term of both breadth and dept.

Thus, the scope of this project is to:

- Provide an extensive search for information in the database
- Provide a categorized and easy to find for the information
- Develop an efficient and reliable system database
- Provide an user friendly and smooth payment process
- Have an intelligent store back office transaction system
- Provide an effective and reliable database updating and maintaining for the administration of the merchant bank

1.7 Expected Outcome

The expected outcome of this module is consisting of two store back office and a store front office. The e-payment system includes two store back office. One is dealer store back office that stores the record of the order information and the payment method of the consumer. The dealer store back office is used to key in the data of the consumer when the consumer doing the payment transaction. All the data are store at the dealer database.

Another store back office is the merchant bank. Merchant bank will authorize the consumer credit account or bank account using the data base that store in the store back office. The merchant bank store back office contains the consumer and the dealer details and using public key to encrypt or decrypt the consumer data. Merchant bank will verify the consumer data and payment before send back the information to dealer.

The store front office of the dealer web site provides the use friendly interface to available consumer making the payment system. Consumer can choose the payment method and select their credit card using their e-wallet. Consumer can print out the receipt of the payment through the store front office of the dealer's web site.

1.8 Limitation of Project

There are a few limitation of this e-payment system:

- Customer cannot print out the receipt and slip.
- Customer cannot pay by phone check because unable connect to telephone.
- Not full security will be provide for the payment transaction because cannot develop the security like the real payment system, such as Security Socket Layer (SSL) protocol and Secure Electronic Transaction (SET).

1.9 Project Timeline

The timeline for the activities of the project are as follows:

Activity	Start Date	End Date	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Concept Definition	4 Jun 2001	8 Jun 2001								
Research and Literature Review	9 Jun 2001	4 July 2001								
Requirement Specification and Analysis	5 July 2001	1 Aug 2001								
System Design	2 Aug 2001	5 Sep 2001								
Incremental Prototyping	6 Sep 2001	26 Dec 2001								
Integration and Testing	27 Dec 2001	25 Jan 2002								

Duration

Figure 1.2 Project Timeline

1.10 Summary

A good management of the project development will lead to project success and produce a high quality system. So, it is need to planning and scheduling the project development to ensure that it is carried out the required standard. All of this planning is the first phase of the project development to give a brief idea of the development system to ensure that it is consistent with the project goal and requirements.

Chapter 2

LITERATURE REVIEW

Chapter 2: LITERATURE REVIEW

2.1 E-Commerce Overview

The consumer moves through the Internet to the merchant's web site. From there, he decides that he wants to purchase something, so he is moved to the online transaction server, where all of the information he gives is encrypted. Once he has placed his order, the information moves through a private gateway to a Processing Network, where the issuing and acquiring banks complete or deny the transaction. This generally takes place in no more than 5-7 seconds.

There are many different payment systems available to accommodate the varied processing needs of merchants, from those who have a few orders a day to those who process thousands of transactions daily. With the addition of Secure Socket Layer technology, e-commerce is also a very safe way to complete transactions.

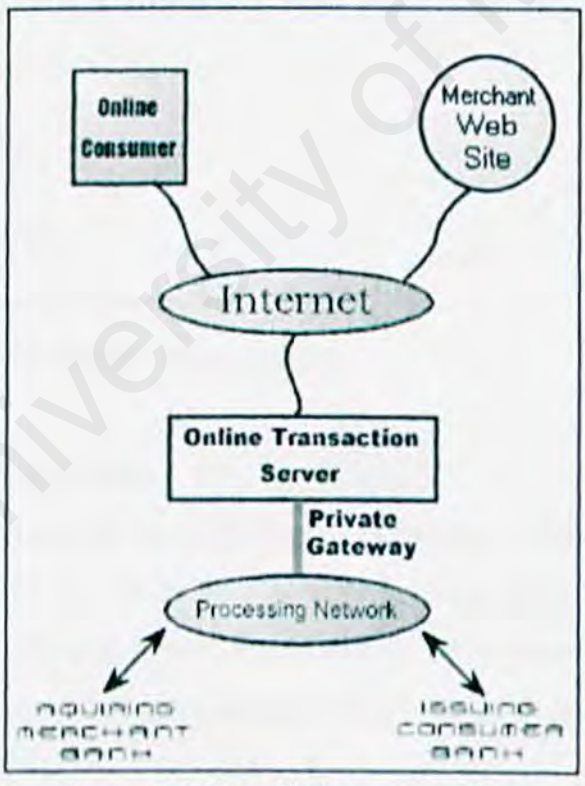


Figure 2.1 How E-Commerce Work

There are several basic steps involved in becoming Commerce Enabled.

1. Getting an Internet Merchant Bank Account
2. Web Hosting
3. Obtaining a Digital Certificate
4. Finding a Provider of Online Transactions
5. Creating or Purchasing Shopping Cart Software

1. Getting an Internet Merchant Bank Account

In order to be able to accept credit cards over the Internet, merchant must apply to their bank for an Internet Merchant Bank Account. This can be relatively easy or somewhat difficult, depending on which country merchant live in and what bank they are with.

2. Web Hosting

Web hosting is a very important step in this process, as this is how merchant gain a presence on the Internet in the first place. It is important that the web hosting company is capable of providing merchant with the level of service that they need to maintain their Web Store. A few things to look for are:

1.Good uptime
2.Good technical support
3.Fast connection to the Net
4.Staff that is knowledgable about e-commerce
5.Compatibility with major e-commerce providers

3. Obtaining A Digital Certificate

A digital certificate, also known as a SSL Server Certificate, enables SSL (Secure Socket Layer Encryption) on the web server. SSL protects communications so merchant can take credit card orders securely and ensure that hackers cannot eavesdrop on them. Any e-commerce company will require merchant to have SSL before they can use their services.

Thankfully, for most people obtaining a digital certificate is not a problem. For a minimal fee, one can usually use the certificate owned by the web hosting company where their

page resides. Merchant should get their own digital certificate if their company is a large company.

4. Finding A Provider Of Online Transactions

Before merchant start looking for a provider, they should stop for a moment and consider what exactly their need. How many transactions do they expect to be completing in a month? How many products do they have to put on their web site? How complex does the software need to be? How much are they willing to spend?

There are a lot of online transaction providers out there, and they all have varying packages. Deciding on a provider's package that fits customers needs is perhaps the most important aspect in creating an e-commerce website.

5. Shopping Cart Software

Shopping cart software is an operating system that can be used to allow people to purchase their items, keep track of their accounts, and tie together all of the aspects of their e-commerce site into one cohesive whole.

While there are many other types of software that prople can use in it's place, such as catalog software or a flat order form, shopping cart software is the most popular and the most widely known.

Many Online Transaction Providers will have shopping cart software that comes with their service, but it can often be very expensive, so be warned. If people cannot afford to spend at least a couple of hundred dollars on this software, they should be looking for a package that offers it as a rental included in the monthly service charge, or one that offers a simple flat order form.

2.2 Transaction On The Internet

Translating check or credit card transaction to the Internet require finding electronic and business model equivalents which are for the functions described above. Signatures and confidentiality are the two biggest problems in creating digital payment instruments. These two issues are typically handled with some form of cryptography. The user of public-private-key pairs allows a message to be signed.

Digitally are verified by anyone who has the public key. Some form of public key infrastructure, such as certificates, must be employed to associate a named user or an account unambiguously with a particular public key. Message digest provide integrity.

Most of the payment system requires special consumer and merchant software to prepare and process electronic payment message. Although the consumer software is often described as an "e-wallet", that term is misleading, turds are never kept in the wallet, which acts rather as an e-check book for signing payment ordering-managing keys, performing cryptographic operations, and formatting message, as well as acting as a click register for keeping track of transactions.

The use of credit cards over the phone for catalogue shopping is well established. Some of the Internet system purpose to extend that model to shopping from Web-based catalogs.

2.3 Electronic Payment Mechanisms

Information technology has created, and continues to create, many new possibilities for value-exchange. Some of the new techniques represent automation of existing methods, whereas others are novel or revolutionary.

The following mechanisms exist, are in pilot, or are being designed:

1. Electronic funds transfer at point of sale (EFT/POS)

EFT/POS involves the use of plastic cards in terminals on merchants' premises. It actually comprises two distinct mechanisms:

i. Debit-card transactions. These were a new form of value-transfer, whereby an account-holder, authenticated by the presentation of a token (a data-bearing card) and the keying of a PIN, uses a terminal and network to authorize the transfer of value from their account to that of a merchant.

ii. Credit-card transactions. These represent the automated capture of data about purchases against a revolving credit account, replacing what have hitherto been 'flick-flack'-generated hard-copy vouchers.

2. Direct data entry transactions

Direct data entry provides a less circuitous path for transaction data than is the case with check. It is also of two types:

i. Direct credit. This involves an instruction by a payer to their financial institution to pay funds into a payee's account with that or another financial institution. A particular sub-class of the direct credit is the standing order, which is a payment instruction activated at regular intervals (e.g. monthly or quarterly);

ii. Direct debit. This involves a payer authorizing a payee to initiate the collection of funds periodically, and is appropriate in circumstances where the amount of the payment varies from period to period (e.g. electricity and telephone bills);

3. Financial electronic data interchange (F-EDI)

F-EDI involves the transmission of payment transaction data, and associated remittance advice data, from a payee to their bank, for on forwarding (via banks and/or value-added network operators) to the payee's bank and the payee;

4. 'home banking'

This term is used for a variety of related methods whereby a payer uses an electronic device in the home or workplace to initiate payment to a payee. In addition to computer technology, it can be performed using the telephone and interactive voice response (IVR).

2.4 Electronic Check

Everyone knows that e-commerce has become a more accepted way to do business. Use e-checks as first secured payment option, and it will increase sales, and drive down processing costs.

Internet can fill this need with a server-based transaction processing system that allows a business to authorize, process, and manage electronic online checks and credit card transactions in a real-time online environment from any computer with a web connection and a web browser.

Merchants pay a premium for real-time online credit card processing. By making electronic online checks customer first payment option, merchants will see a reduction in their processing fees, significantly adding to their bottom line.

The e-Check is a cost-effective, fully automated payment solution that eliminates returned check fees for the merchant. With a traditional paper check system, the merchant deposits the check in their bank account. Any returned item is sent back to the merchant's bank, and fees are assessed. With an electronic system, the merchant's bank is bypassed as the original point of deposit; therefore we handle the returned items on behalf of the merchant, eliminating associated fees

Merchants can access reports over the Internet 24 hours a day, 7 days a week, which will facilitate bank statement reconciliation. Funds are settled within two business days, compared to the delays due to mail delivery times and the clearing times associated with paper checks. Online checks promote "impulse" purchases. Consumers can make a check payment immediately, rather than writing one out and mailing it to the merchant.

As e-Commerce sales continue their rise, many online merchants are searching for more and better ways to handle their online transactions. Although many sites currently offer

credit transactions, they are finding their inability to accept online checks keeps them from maximizing sales.

Most of the online check options currently available merely provide a paper check for customers deposit. This type of system is slow, costly, and difficult to manage when compared to a purely electronic solution.

2.5 Credit Card

A credit card is a token of trust that transfers the risk of granting credit from a merchant to the card-issuing bank. Once a merchant has had a purchase authorized by the card issuer over the private authorization network, the merchant is assured of payment and card issuer assumes responsibility of billing the consumer and collecting the money. Settlement takes places later, when the merchant periodically submits a batch of authorized transactions to the merchant's bank for settlement with the card issuer.

In a card-present transaction, the merchant validates the payer's signature by matching the one on the bank of the card against the one on the charge slip. Integrity is protected by he device of giving the consumer "carbon copy" of the slip. The embossed number on the credit card verifies the consumer's account number. Settlement is handled by card association (such as Visa and MasterCard). The merchant receives immediate confirmation of a transaction while submitting it for authorization through the card association's private ata network.

2.5.1 How Credit-Cards Work

A credit-card transaction is an instruction by customer for funds to be transferred into merchant account and charged against theirs. The customer gives the instruction directly to merchant. Later, the customer will have to make a payment to their bank, typically once each month, to settle all recent transactions. The primary steps involved are shown in the following diagram.

The most common examples of credit cards are those bearing the Bankcard, Visa and MasterCard brands and issued by Australian financial institutions. AmEx and Diners' Club charge-cards operate in a very similar manner, but the account is not held with a bank.

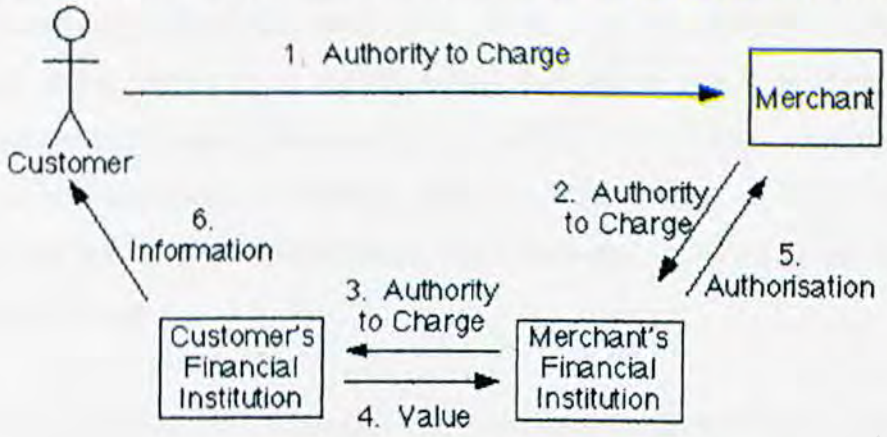


Figure 2.2 Steps In A Credit-Card Transaction

2.6 Database Management System

Database technology is used in a variety of applications, which some serve only a single user on a single computer and others are for multi-users. The Database Management System is the tool that enables us to manage and interact with the database. There are a variety types of database management system, such as Microsoft SQL Server 7.0, Oracle 8i, Sybase, Informix, MySQL and also Microsoft Access. Most of the database management systems are able to perform these tasks:

- Store data
- Create and maintain data structures
- Allow concurrent access to many users
- Enforce security and privacy
- Allow extraction and manipulation of stored data
- Enable data entry and data loading
- Provide an efficient indexing mechanism for fast extraction of selected data
- Provide consistency among different records
- Protect stored data from loss by backup and recovery process

2.6.1 Microsoft SQL Server 7.0

Microsoft SQL Server 7.0 is a single process, multithreaded relational database server primarily intent for transactional processing. It is a key component in answering data management requirement, which require a large amount of information and serve many different simultaneous users. Microsoft SQL Server 7.0 is based on the client/server architecture, which divides processing into two components: a front-end, or client component, that run on a local workstation and a back-end, or server component, that runs on a remote computer.

The server can communicate with any ODBC compliant software program that resides on a computer connected to the network. Request to the server are made in the Structured Query Language (SQL), a non-procedural language that has become the standard for use with relational database. It is also tightly integrated with the Microsoft Back Office family product to enable organization to improve the decision's making process and the streamline of the business process.

Microsoft SQL Server 7.0 provides innovations in performance, reliability and scalability as below:

i) Scalability

SQL server is designed to accommodate more data, transactions and users with ease. It is scalable from laptop to multiprocessor clusters to accommodate terabytes of data and thousands of users. It also provides dynamic row-level locking for high-end online transaction processing (OLTP) and data warehousing systems. The query processor in SQL Server also provides powerful support for large databases and complex queries.

ii) Internet, Intranet and Commerce

The cutting-edge features and seamless integration with Microsoft Windows NT and Microsoft BackOffice make SQL Server an important factor in Internet, Intranet and electronic commerce strategy. The full-text search can support the linguistic search to create special indexes of pertinent words and phrases in selected columns of selected table.

Furthermore, the Web Assistant enhances the SQL Server Web Assistant to easily generate HTML and WML files from SQL Server data. The Internet replication is also easier than ever with anonymous subscriptions and built-in support for Internet distribution. It supports Internet database integration and allows the user to automate the publishing of database information in the HTML documents, built active web sites and conduct the processes on the Internet.

iii) Desktop, Mobile and Distributed System

Microsoft SQL Server is designed so that organizations can give employees and customers to ability to work with data reliably from simply everywhere. The SQL Server Desktop provides a single code base for all platforms, which from a laptop running Windows 95 to clustered systems running Windows NT Server. The Enterprise Edition also provides 100 percent application compatibility.

iv) Ease of Use

Microsoft SQL Server makes it easy for database administrators to build, manage and deploy business applications. It automates standard database administration operations. It automates standard database administration operations and adds some sophisticated new tools to simplify the managing complex operations. For example, the Dynamic Self-Management automates many routine tasks. The Multiple-site management by using the SQL Server Enterprise Manage also can designate a master server that communicates and distributes jobs, alerts and event messages to targeted servers. The profiling and tuning tools also help to simplify the process of finding the process of finding and fixing database problems by capturing and replaying server activity.

v) Data Warehouse

The SQL Server will ensure that information in all level of an organization can flow smoothly and inexpensively. The data transformation services make it easy to import, export and transform heterogeneous data using OLE Database, Open Database

Connectivity (ODBC) or text-only files. This means that it provides automatic distributed update capability across two or more SQL. Furthermore, the repository integration and the Open Information Model help integrate and share meta-data about SQL Server database, Online Analytical Processing (OLAP) and Data Transformation Services. It also maintains referential integrity and ensures that operation can be recovered in the event of numerous type s of failure.

2.6.2 MySQL

MySQL is a relational database management system. The SQL part of MySQL stands for "Structured Query Language", the most common standardized language used to access databases. It is an open source software. Open source means that it is possible for anyone to use and modify. Anybody can download MySQL from the Internet and use it without paying anything. Anybody so inclined can study the source code and change it to fit their needs.

MySQL is very fast, reliable and easy to use. MySQL was originally developed to handle very large databases much faster than existing solutions. Though under constant development, MySQL today offers a rich and very useful set of functions. The connectivity, speed and security make MySQL highly suited for accessing databases on the Internet.

MySQL is a client/server system that consists of a multithreaded SQL server that supports different backends, several different client programme and libraries, administrative tools, and a programming interface.

2.6.3 Comparison Between Microsoft SQL Server 7.0 and MySQL

- Microsoft SQL Server can run only on windows but for MySQL the operating system will essentially become irrelevant because it can support all kinds of platform like UNIX

- MySQL is open source databases.
- SQL Server reduced the complexity for users, administrators and developers. This means it provides ease-of use processes solution at the lower cost for the distributed computing.
- SQL Server 7.0 also tightly integrates with other Microsoft products. Its' seamless integration with Windows NT provides security, a web application environment and Microsoft Transaction server support.

2.7 Web Server

Web server is a network server that manages access to files, folders and other resources over the Internet or local Intranet via the platform-neutral HTTP (HyperText Transfer Protocol). They handle permissions, execute programs, keep track of directories and files and communicate with client computer.

2.7.1 Apache Web Server

Apache is a general web server, which is designed to correct first and fast second. It is a powerful, flexible, HTTP/1.1 compliant web server. It implements the latest protocols, including HTTP/1.1. Besides that, it is also highly configurable and extensible with third-party modules. Apache web server can support many operating systems such as Windows NT/9x, Netware 5.x, OS/2, and most versions of Unix, as well as several other operating systems. The apache implements many frequently requested features, including:

i) DBM databases for authentication

It allows user to easily set up password-protected pages with enormous numbers of authorized clients, without bogging down the server.

ii) Customized responses to errors and problems

Apache web server enables users to set up files, or even CGI scripts, which are returned by the server in response to errors and problems, e.g. setup a script to intercept 500 Server Errors and perform on-the-fly diagnostics for both clients and web administrator.

iii) Multiple DirectoryIndex directives

It enable user to indicate DirectoryIndex index.html index.cgi, which instructs the server to either send back `index.html` or run index.cgi when a directory URL is requested, whichever it finds in the directory.

iv) Unlimited flexible URL rewriting and aliasing

Apache has no fixed limit on the numbers of Aliases and Redirects, which may be declared in the config files. In addition, a powerful rewriting engine can be used to solve most URL manipulation problems.

v) Content negotiation

It is also provides the ability to automatically serve clients of varying sophistication and HTML level compliance, with documents which offer the best representation of information that the client is capable of accepting.

vi) Virtual Hosts

A much requested feature, sometimes known as multi-homed servers. This allows the server to distinguish between requests made to different IP addresses or names (mapped to the same machine). Apache also offers dynamically configurable mass-virtual hosting.

vii) Configurable Reliable Piped Logs

Users can configure Apache to generate logs in the format that they want. In addition, on most Unix architectures, Apache can send log files to a pipe, allowing for log rotation, hit filtering, real-time splitting of multiple vhosts into separate logs, and asynchronous DNS resolving on the fly.

2.7.2 Microsoft Internet Information Server (IIS)

Internet Information Server 4.0 supports multiple web server scenarios, ranging from simple web sites on an Intranet to large Internet Service Provider (ISP) web hosting farms. It provides a transactional-based web server that is tightly integrated with the NT operating system and also a number of components that make it easier to build dynamic web sites, manage content and analyze usage.

The advantages of IIS can be divided into two categories, which are the advances in HTTP-related service areas and the additional functionality in managing and developing application functionality. The advancements in the http services area enable IIS to manage multiple web sites, tailor site or application specific setting. The index Server 2.0 that served by IIS 4.0 enables web clients with any browser to search a web site by filling in the fields of an HTML query form. It also provides such advancements for the application development side such as transactional-based applications, process isolations, Secure Sockets layer (SSL) support, Active Data Object (ADO) and new development tools. For example, the certificate server which is a highly customizable server application for managing the issuance, revocation and renewal of digital certificates can help the organizations to perform authentication on a corporate Intranet or across the Internet.

Furthermore, there is a Site Server Express that includes site analysis, usage analysis and publishing capabilities, enables the administrator to analyze log file data, crawl a web site to map content and check for broken links and easily publish content from browser to IIS server.

The benefits of IIS can be seen by the services it provided. IIS provides a high-speed, secure platform for publishing information on internal networks or Internet. The server is specifically designed to provide the kind of performance that is necessary for handling an increased number of web users. It is also designed to meet the requirement of the users who are connected with high-speed lines, such as ISDN and leased line.

The transaction ASP features of IIS also allows application with script add components to perform multiple actions. For example, a failure occurs during a particular transaction, IIS automatically backs up the server to the start of the transaction, allowing the user to recover from failure without any loss of data.

2.7.3 Comparison Between Apache Web Server and Microsoft Internet Information Server (IIS)

- Apache Web server can support many operating systems such as Windows NT/9x, Netware 5.x, OS/2, and most versions of Unix, but IIS works closely with Windows NT.
- Apache Web Server support server-side programming, like PHP, Perl, ASP, but IIS works best in ASP only.
- IIS has user friendly interface for user, but Apache Web Server just has a dos window.

2.8 Web Languages

2.8.1 Hypertext Markup Language (HTML)

Hypertext Markup Language (HTML) is not a procedural programming language like C, Fortran, Cobol, or Pascal. Rather it is a markup language for identifying the elements of a page so that a browser, such as Microsoft's Internet Explorer or Netscape's Communicator, can render that page on computer screen.

HTML is used to format text and information. This "marking up" of information is different from the intent of traditional programming languages, which is to perform actions in a designed order.

In HTML, text is markup up with elements, delineated by tags that are keywords contained in pairs of angle brackets. For example, the HTML element itself, which indicates that we are writing a Web page to be rendered by a browser, begins with start tag of <HTML> and terminates with an end tag of </HTML>.

2.9 Web Server Scripting Language

2.9.1 PHP

PHP is a language for creating interactive web sites and is used on over 3.3 million web sites around the world. PHP is a server-side, cross-platform, HTML embedded scripting language. This means that it works within an HTML document to confer to it the capacity of generating content on demand. It was originally called "Personal Home Page Tools" when it was created in 1994 by Rasmus Lerdorf to keep track of who was looking at his online resume. PHP also acronym for: PHP Hypertext Preprocessor).

PHP is a tool that lets people create dynamic web pages. PHP-enabled web pages are treated just like regular HTML pages and people can create and edit them the same way people normally create regular HTML pages.

PHP was designed to work on the web, and in this ambit it excels, connecting and querying a database is a simple task that can be handled in 2 or 3 lines of code. The PHP scripting engine is well optimized for the response times needed on Web applications, it can even be part of the Web server itself improving the throughput even more.

If it were only a matter of improving the speed of the scripts, then PHP will be one of many solutions. But there is more to the PHP equation than that. There is the simplicity and robustness of the language and the scripting engine. There is the connectivity to an ever-increasing number of database servers, the shorter development cycles and the ease of creating modular and reusable components.

PHP comes with a myriad of options, both to build the distribution and also to configure an installation. PHP supports several APIs and interfaces to other programming tools. The sheer number of these tools is daunting, not to speak of the configuration possibilities for each of these.

The PHP will make some decision and create a page that is appropriate for the exact solution. Thus, when using PHP the server actions are as follows:

- Read the request from the browser.
- Find the page on the server.
- Perform any instructions provided in PHP to modify the page.
- Send the page back across the Internet to the browser.

2.9.2 Active Server Page (ASP)

Microsoft initially release ASP in January 1997. It is a great tool for creating the dynamic, interactive and high performance web page. It provides the ability to combine HTML, scripting and components to create powerful Internet applications that run on server. One of the power for ASP is the HTML is not created until the user wants to see the web page. Besides that, any web browser can be use. There are some others key features of the ASP as below:

- ASP code can be mixed within HTML on a page that it does not need to be compiles separately or deployed.
- ASP can interact with almost others existing web page technology, such as Common Gateway Interface (CGI), Internet Server Application Programming Interface (ISAPI) and also scripts written in PERL, Python and AWK.
- The ASP must be executes on a computer that supports it, then the ASP-driven web pages can be viewed from any computer and with any browser.
- It works together with Windows NT and IIS to provide a comprehensive set of key software technology that enables secure exchange of information over public networks access control to server resources and confident identification of server and client.
- ASP supports server components built with other language. The compiled code from Java, C++, Visual Basic and Delphi can be assembled easily into a component that HTML programmers can call within their ASP page.

- It also has many third party components that can be required for free to reduce programming time.

2.9.3 Comparison Between PHP And Active Server Pages

- PHP provides a comprehensive, server-side programming environment with an easy-to-learn syntax that cleanly integrates with HTML. ASP uses scripting languages (VBScript, Jscript) to handle much of its server-side programming.
- For the database connectivity, PHP access any relational database with a single tag. ASP sets up and uses ODBC connections through ADO,
- ASP can only use with a Microsoft web server (IIS, PWS) on a Microsoft operating system (Win9x, WinNT), PHP can use in platform beside Microsoft operating system, like UNIX with Apache Web Server.
- PHP including new engine with support for COM components, but for ASP, the lack of the wide COM support reduce their effectiveness.

2.10 Security Protocol

Everyone using the Web for e-commerce needs to be concerned about the security of his or her personal information. There are several protocols that provide transaction security, such as Secure Sockets Layer (SSL) and Secure Electronic Transfer (SET). I will discuss these security protocols, plus public-key cryptography, digital signatures and digital certificates.

2.10.1 Secure Sockets Layer (SSL)

The SSL protocol, developed by Netscape Communications, is a non-proprietary protocol commonly used to secure communication on the Internet and the Web. SSL is built into many Web browsers, including Netscape Communicator, Microsoft Internet Explorer and numerous other software products. It operates at the network level, between the Internet's

TCP/IP (Transmission Control Protocol/Internet Protocol) communications protocol and the application software.

In a standard correspondence over the Internet, a sender's message is passed to a socket that interprets the message to TCP/IP. TCP/IP is the standard set of protocols used for communication between computers on the Internet. Most Internet transactions are sent as a (possibly large) set of individual message pieces, called packets. At the sending side, the packets of one (possibly long) message are numbered sequentially, and error-control information is attached. TCP routes packets to avoid traffic jams, so each packets might travel a different route over the Internet. At the receiving end, TCP makes sure that all of the packets have arrived, puts them in sequential order and determines if the packets have arrived with integrity and without alterations. If the packets have been altered, TCP/IP will re-transmit the packets. TCP/IP then passes the message to the socket at the receiver's application. In a transaction using SSL, the sockets are secured using public-key cryptography.

SSL uses public-key technology and digital certificates to authenticate the server in a transaction and to protect information as it passes from one party to another over the Internet. SSL transactions do not require client authentication. To begin, a client sends a message to a server. The server responds and sends its digital certificate for authentication. The client and server negotiate session keys to continue the transaction. Session keys are symmetric secret keys that are used for the duration of that particular transaction. Once the keys have been established, the communication proceeds between the client and the server by using the session keys and digital certificates.

Although SSL protects information as it is passed over the Internet, it does not protect private information, such as credit card numbers, stored on the merchant's server. When a merchant receives credit card information with an order, the information is often decrypted and stored on the merchant's server until the order is placed. If the server is not secure and the data is not encrypted, an unauthorized party could access the information.

Secure Sockets Layer (SSL) provides sound privacy protection by encrypting the channel between the consumer and the merchant. Because the data sent over the channel is secure, SSL is sufficient security when doing business with merchants people know and trust. To find out if their transaction is secured by SSL, check for the unbroken key or closed lock symbol in the frame of their browser window. Or check the merchant's URL -- it should change from "http" to "https" when processing secure transactions. Both the Netscape Navigator and Microsoft Internet Explorer browsers use SSL.

2.10.2 Secure Electronic Transaction (SET)

The Secure Electronic Transaction (SET) protocol, developed by Visa International and MasterCard, was designed specifically to protect e-commerce payment transactions. SET uses digital certificates to authenticate each party in an e-commerce transaction, including the customer, the merchant and the merchant's bank. Public-key cryptography is used to secure information as it is passed over the Web.

SET is an open-network payment card protocol that provides greater confidentiality, greater transaction integrity and less opportunity for fraud at all transaction points that any other existing secure payment system. The process invloves a series of security checks performed using digital certificates, which are issued, to participating purchasers, merchants, banks, and payment brands. SET uses an encryption technology that helps protects the transfer of payment information over open-network.

Merchants must have a digital certificate and special SET software to process transactions. Customers must have a digital certificate and digital wallet software. A digital wallet is similar to a real wallet. It stores credit (or debit) card transaction for multiple cards, as well as digital certificate verifying the cardholders' identity. Digital wallet adds convenience to online shopping; customers no longer need to re-enter their credit card information at each different site.

Here is how an e-commerce transaction using SET works. When a customer is ready to place an order, the merchant's SET software sends the order information and the merchant's digital certificate to the customer's digital wallet, thus activating the wallet software. The customer selects the card for the transaction. The credit card and order information are encrypted by using the merchant's bank public key and sent to the merchant along with the customer's digital certificate. The merchant then forwards the information to the merchant's bank to process the payment. Only the bank can decrypt the message. The merchant's bank then sends the amount of the purchase and its own digital certificate to the customer's bank to get approval to process the transaction. If the customer's charge is approved, the customer's bank sends an authorization back to the merchant's bank. The merchant's bank then sends a credit card authorization to the merchant. Finally, the merchant sends a confirmation of the order to the customer.

SET technology protects payment information in four ways

- It enables a cardholder to authenticate that a merchant is authorized to accept payment cards in a secure manner using SET technology.
- It enables a merchant that is using SET technology to authenticate the payment card being used in the transaction.
- SET technology uses an advanced encryption system to protect personal payment information during transfer over the network.
- SET technology makes sure only the intended recipient reads the payment information. Information, which can only be decade, is a merchant and financial institution that both use valid SET technology. With all these added safety features, both cardholders and merchants can feel safer features, especially when transferring payment information online.

SET uses of locks and keys along with certified account for both consumers and merchants. Then, through a unique process of "encryption" or scrambling the information exchanged between the shopper and the online store. SET ensures a payment process that is convenient, private and most all secure, specially, SET:

- Establishes industry standards to keep your order and payment information confidential.
- Increase integrity for all transmitted data through encryption.
- Provides authentication that a cardholder is a legitimate user of a branded payment card account.
- Provides authentication that a merchant can accept branded payment card transaction through its relationship with an acquiring financial institution.
- Allow the use of the best security practices and system design techniques to protect all legitimate parties in an electronic commerce transaction.

2.10.2.1 How SET Work

While the underlying process for SET transactions is complex, an Internet purchase can be processed, authorized, and completed in a matter of seconds. Visit The World of Visa Secure Electronic Commerce for an animated demonstration explaining how SET works -- and how you can use it to shop securely.

1. First, cardholders obtain digital wallets.

A cardholder's digital wallet software communicates with a merchant's SET software automatically to verify the merchant's certificate and relationship with a trusted financial institution. SET-enabled digital wallets will be made available through several approved vendors online, in new versions of popular browsers, and may be provided by financial institutions.

2. Second, cardholders obtain digital certificates.

Cardholders must first contact their financial institution for registration procedures. Visa provides digital certificates to a card-issuing financial institution, which then provides a digital certificate to the cardholder. At the time of the payment transaction, each party's SET software validates both the merchant and cardholder's digital certificate before payment information is exchanged.

3. Third, cardholders and merchants conduct a shopping dialogue.

When you make a decision to purchase an item online, the merchant sends an order form together with its merchant certificate. You simply select the payment card you want to use, and your software application automatically sends the related certificate when you place your order. Payment instructions are created by the cardholder software and sent to the merchant fully disguised using public key cryptography so that the merchant cannot see the payment card information until the merchant's financial institution decrypts it.

Note that it is possible for cardholders to shop securely using SET without digital certificates. While this limits the merchant's ability to authenticate the cardholder, the SET payment transaction will still be completed according to specifications.

4. Fourth is the authorization and settlement process.

Once the purchase and payment information has been safely received, the merchant's financial institution requests an authorization from the cardholder's financial institution, just like retail transactions are handled today. Once authorized, the merchant can confirm the sale to the cardholder. Clearing and settlement take place just as they do for today's payment card transactions.

SET uses public/privacy cryptography to provide authentication of merchants, cardholders and acquirers, but preservers the confidentiality of payment data. For example, credit card info is encrypted all the way to the issuing bank, so the merchant never sees the credit card number. The bank on the other hand, does not see details on the merchandise purchased. SET also secures the physical connection throughout the entire transaction. Figure 2.3 show how SET works:

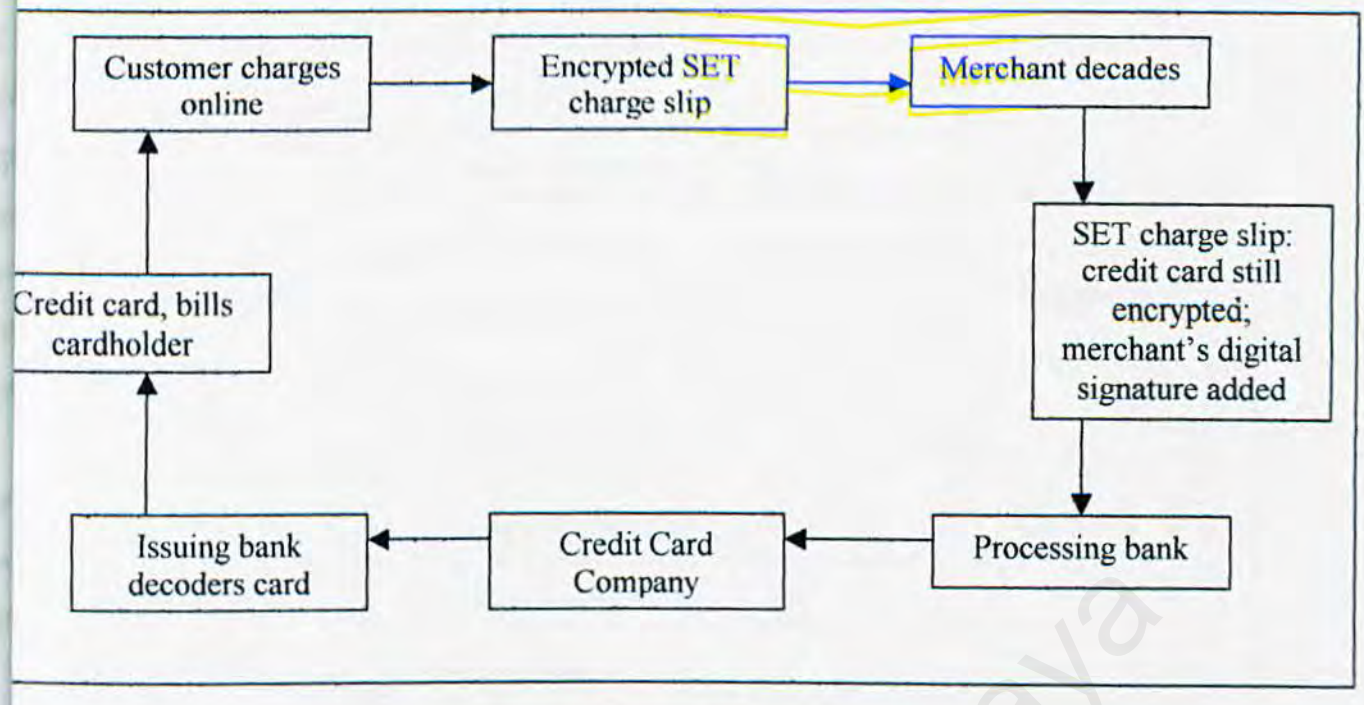


Figure 2.3 How SET Works

Figure 2.4 illustrates the process that takes place in the figure 2.3. The operation of the Secure Electronic Technology (SET) protocol relies on sequences of message. In the first two, the consumer and merchant signed their intention to do business and then exchange certificates and establish a transaction ID number. In the third step the purchase request contains a signed hash of the goods and service order, which is negotiated outside the protocol. This request is accompanied by the consumer's credit card information, encrypted so that only the merchant's acquiring bank can read it. At this point, the merchant can acknowledge the order to the consumer, seeking authorization later (steps five or six) or perform steps five and six first and confirm authorization in step four. Steps seven and eight give the consumer a query capability, while the merchant uses steps nine and ten to submit authorization for capture and settlement.

Note that, although an encrypted charge slip is sent to the merchant, who can decode the transaction information, the merchant does not know the credit card number and bank does not know the details of the purchase.

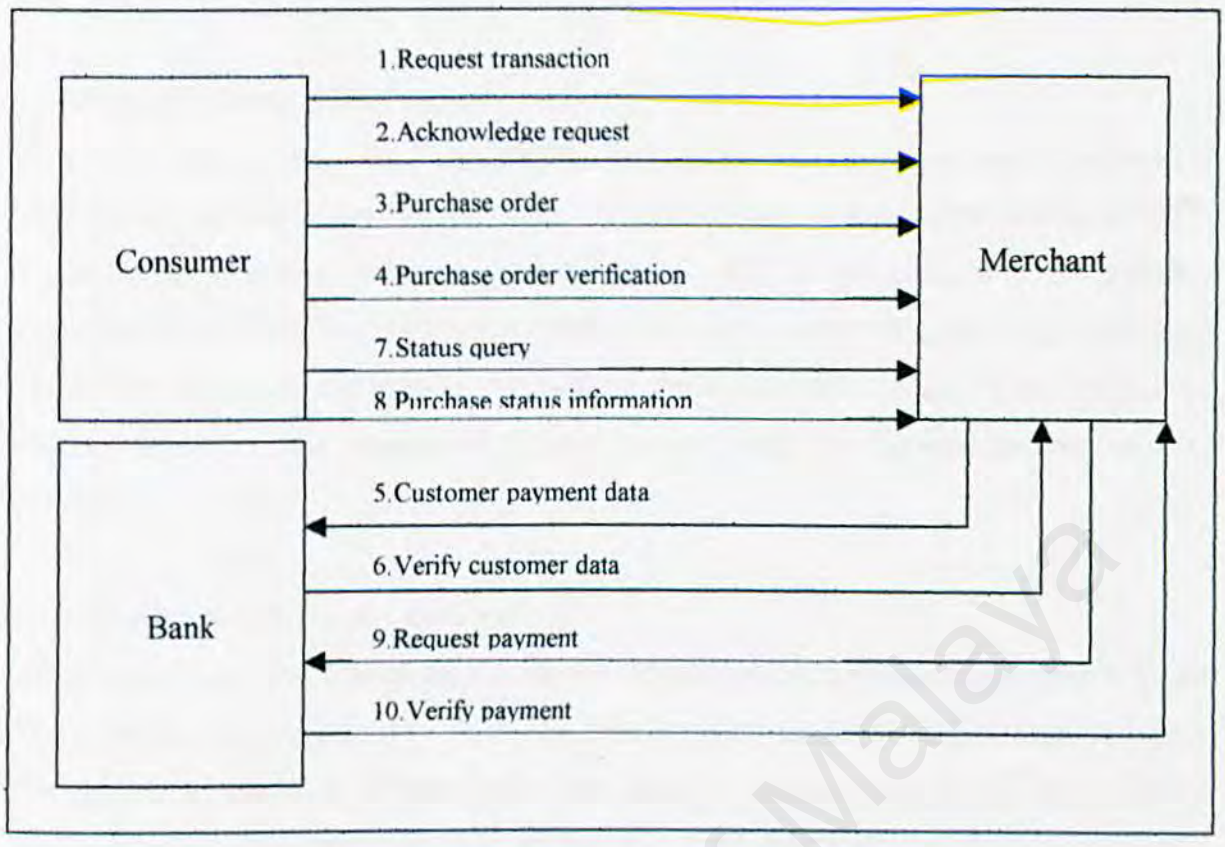


Figure 2.4 The Operation Of SET

2.10.2.2 Advantages of SET

Provides confidentiality of payment information and enables confidentiality of order information that is transmitted along with the payment information.

- Ensures the integrity of all transmitted data.
- Provides authentication that a cardholder is a legitimate user of a branded payment card account.
- Provides authentication that a merchant can accept branded payment card transaction through its relationship with an acquiring financial institution.
- Ensures the use of the best security practices and system design technologies to protect all legitimate parties in an electronic commerce transaction.
- Creates a protocol that neither depends on transport security mechanisms nor presents their use.
- Facilities and encourages interoperability among software and network providers.

2.10.2.3 How SET Provide Security In Shopping

1. Cardholders obtain digital wallet

A digital wallet is a type of software that facilities online shopping. Therefore, it allows the consumers to automatically communicate with their respective merchants. On the contrary, a cardholder's wallet software communicates with a merchant's SET software automatically to verify the merchant's relationship with a trusted financial institution. SET enabled the use of digital wallets and will be made available through several approved vendors online, in new versions of popular browser, and may be provided by financial institutions.

2.Cradholders obtain digital certificates

Cardholders must first contact their financial institution for registration procedures. Some of the brands such as Visa provide digital certificates to a card-issuing institution, which then provides a digital certificate to the cardholder. A similar process takes place for the merchant and its financial institution. At the time of the payment transaction, each party's SET software validates both the merchant and cardholder's digital certificate before payment information is exchanged. The validation extends easily to the global Internet marketplace by checking the digital certificates issued by an authorized international third party such as Visa. In the simplest terms, the digital certificates ensure that the parties can confidently conduct online shopping transactions.

The cardholder's SET software validates that the merchant is certified to accept SET transaction and that the merchant is authorized by its financial institution to accept Visa cards for payment. The merchant's SET software verifies that the consumer has a legitimate payment account providing the power to pay.

3.Cardholders and merchants conduct a shopping dialogue

When the cardholders make a decision to purchase an item online; the merchant sends on order from together with its merchant certificates. The cardholders simply select the payment card they want to use, and the software application automatically sends the related

certificate when the cardholder places their order. Payment instructions are created by the cardholder software and sent to the merchant fully disguised using public key cryptography so that the merchant cannot see the payment card information until the merchant's financial institution decrypts it.

4.Authorization and settlement process

Once the purchase and payment information is safely received, the merchant's financial institution requests an authorization from the cardholder's financial institution. According to the SET specification these process ensure that the card number arrives safety at the merchant's financial institution. These authorization and settlement processes are today's normal practiced for card payment transaction every when in the physical world.

2.10.3 Digital Certificate

SET provides a way for cardholders and merchants to identify each other before a transaction takes place. This assures both parties that the payment will be handled in the same way as it is today in the physical marketplace.

This authentication process uses electronic forms of identification known as digital certificates that are issued to cardholders and merchants by Visa's member financial institutions. SET also incorporates the use of public key cryptography to protect the privacy of personal and financial information. As a result, with SET, consumers' payment card information is protected all the way to the financial institution. The merchant cannot read this information in the payment transaction.

With SET, cardholders can validate that the Internet merchant is legitimate through the merchant's digital certificate. SET software automatically checks that merchant has a valid certificate representing their relationship with their financial institution. This provides consumers with the confidence that their payments will be handled with the same Visa promise that they trust today.

2.10.4 Public-Key Cryptograph

Public key cryptography is also known as symmetric cryptography. It uses two keys: one to encrypt the message and the other key to decrypt the message. The two keys are mathematically related so that data encrypted with either key can only be decrypted using the other.

A cipher encrypted using public key encryption is sometimes called a trapdoor cipher. If you have only one key, the public key, it is easy to encrypt a message, but it is impossible to decrypt it without the private key. Like a trapdoor it easy to go in one direction, but very difficult to go in the other.

The fundamentals of public key encryption are:

- Instead of a single encryption key, there are two related keys, a key pair.
- Anything encrypted using one of the two keys can only encrypt with the other key pair.
- Knowing one key (the public key) is no help for deterring the other key (private key).

In the public key encryption anything encrypted with a public key can be decrypted only with the corresponding private key, and vice versa. Each user has two keys: a public key and a private key. The user distributes the public key. The key pair can then be used for message encryption or sender authentication.

2.10.5 Secret Key Encryption

Secret key cryptography also known as symmetric cryptography uses the same key to encrypt and decrypt the message. Therefore, the sender and the recipient of a message must share, namely the key. This shared key allows the receiver of the message. Symmetric encryption algorithms used by computers have a mechanism to scramble the message (also known as a cipher) and a shared secret (a key) that allows the receiver to unscramble the encrypted message.

The fundamental of secret key encryption are:

1.There is a single encryption key, which also used for decryption.

2.Everyone who sends or receives ciphers must have the key and must be trusted to keep in secret.

2.10.6 Digital Signatures

A digital signature is a combination of two encryption methods: a one-way hash function and public-key encryption. It is used to ensure integrity of a message and authentication of the sender. First passing the message through a one-way hash function generates a message digest. Then the digest of a message is encrypted using the sender's private key and is appended to the original message. The result is known as the digital signature of the message.

This ensure authentication because the recipient of the digital signature can be sure that the message really came from the sender. And, because changing even one character in the message changes digest in an unpredictable way, the recipient can be sure that the message was not changed after the message.

2.11 Analysis and Study

Analysis and study is a process of combining together the findings to theorize possible situation. This study has been made on five types of Web sites. They were:

1. Shopping Cart Technology: Amazon.com
2. Online Store: Yahoo! Store
3. Online Payment: CyberCash.com
4. Online Auction: eBay.com
5. Online Trading: E*TRADE

2.11.1 Case Study 1: Amazon

Perhaps the most widely recognized example of an e-commerce that uses shopping cart technology is Amazon.com. The company opened its "electronic doors" in 1994 and has rapidly grown to become one of the world's largest online retailers. Amazon offers millions of different products to more than 10 million customers.

In its first few years, Amazon.com served as a mail-order book retailer with a rather small inventory. Amazon.com has since expanded to include music, videos, DVDs, electronic cards, customer electronics and toys. Amazon.com uses a sophisticated database on the server side that allows customers on the client side to search for millions of products in a variety of ways. This is an example of a client/server application.

The database that is used is a collection of product specifications, availability, shipping information, stock levels, on-order information and other data. Book titles, authors, prices, sales histories, publishers, reviews and in-depth descriptions are stored in the database. The database makes it possible to cross-reference products. For example, a novel may be listed under various categories, including fiction, best sellers and recommended titles.

Upon returning to the site, customers are greeted by name and a list of recommended titles presented, based on the customer's previous purchases. The list of recommended titles suggested that Amazon searches the customer's database for patterns and trends among its clientele. By monitoring such customer data, Amazon provides a service that would otherwise need to be handled by sales representatives. Amazon's computer system drives sales of additional items without human interaction.

Buying a product at Amazon is simple. Customers begin at the Amazon.com home page and decide the type of product you would like to purchase. For example, if customers are looking for a book, customer can find the book by using the search box in the top-left corner of the home page. Select Books in the Search Box, and then type the title of the book into the window. This takes customers directly to the product page for the book. To

purchase the item, select Add to Shopping Cart on the product page for the book. The shopping cart technology processes the information and displays a list of the products customers have placed in the shopping cart. Customers then have the option to change the quantity of each item, remove an item from the shopping cart, check out or continue shopping.

When customers are ready to place their order, they proceed to checkout. As a first-time visitor, they will be prompted to fill out a personal identification form including name, billing address, shipping address, and shipping preference and credit card information. They are also asked to enter a password that they will use to access their account data for all future transactions. Once they confirm their information, they proceed to place your order.

When customer's order is placed, Amazon sends a confirmation to them by email. A second email is sent to confirm when the order is shipped.

In 1996, Amazon involved a unique e-commerce marketing strategy to bring new customers to their Web site. Companies and individuals can create an income stream in exchange for posting Amazon links on their web sites, thus sending their visitors to Amazon. This is known as the Amazon.com Associates Program. In industry, these programs are commonly called affiliate programs. Associates post links to Amazon.com from their Web sites. If customers use the link to click over the Amazon and then purchases a product, the associate receives a percentage of the sale as a referral fee. Higher referral fees may be paid for products sold through direct links to a specific item. Amazon.com sends weekly activity reports to associates, detailing click-through, sales and accrued referral fees.

This Associates Program is an example of how the Internet and the Web are profoundly changing the way business is done. Without the Internet and the Web, this type of program would not be feasible.

2.11.1.1 Benefits to Shopping at Amazon

- The online catalog allows customers to navigate quickly among millions of product offerings.
- Amazon.com personalizes its site to service returning customers; this capability suggests that the database keeps a record of all previous transaction, including items purchased, shipping and credit card information.
- Customers returning to Amazon can use its 1-click system. This allows the customer to reuse previously entered payment and shipping information to place an order with just one click of the mouse. This is an excellent example of how an intelligently designed database application can make online business transactions faster and easier.
- Customers can track the status of their purchase until it leaves the Amazon.com shipping center by selecting Your Account Maintenance page.
- Customers can cancel their order at any time before the product is shipped. Products are usually shipped within 24 hours.
- Amazon.com operates on a secure server that protects customer's personal information.
- If customers feel uncomfortable using their credit card on the Web, they can place their order through their Web site using the last five digits of your credit card, then they can call Amazon's Customer Service Department to provide the remaining numbers to completes their order.

2.11.1.2 Comments On Amazon

- Have a limitation on the type of the online transaction, just can receive some company credit card.
- So many procedure to process the shopping and shipping system, two mail had to send, one for confirmation and another one for confirmation of the shipping.

2.11.2 Case Study 2: Yahoo! Store

Yahoo! Store is a one of the most popular online store-builder solution that allow merchants to set up online store-fronts, complete with catalogs, shopping carts and order-processing capabilities. These fixed-price options are available to businesses of all sizes and are ideal for small businesses that cannot afford custom solutions or do not have secure merchant servers. Yahoo! Store is available at http://store.Yahoo.com.

Yahoo! Store charges a monthly fee based on the number of items customers want to sell. This prepackaged product is designed to simplify setting up an online store. All of the features customers need to set up a complete e-commerce site are included.

To set up a demo store, click the Create a Store link. Under I'm a New User click Sign me up! Customers will need to enter the address and name for their site. Customers will be presented with the Yahoo! Store Merchant service Agreement which they must accept before they can proceed to build their demo store. The online demo store will be hosted for several days. Setting up a demo store is free, but customers cannot accept orders through a demo store. After accepting the agreement, Yahoo! Store provides detailed directions to help merchants set up active online storefronts.

Customers can change the style of their Web site by clicking on the Look button. There are several style templates. If customers do not like the templates, there can select Random to change the colours and fonts. Yahoo! Store automatically sets up the shopping cart and secure order forms so consumer can purchase products through their new Web site.

To set up a working storefront where customers can accept orders, they must sign on with Yahoo! Store and set up a merchant account, so that their site can accept credit card payments. Generally, merchant banks and/or credit card companies collect a small percentage of each transaction as their fee.

2.11.2.1 Benefits to Setting Up a Yahoo! Store

- Yahoo! Store merchants can track sales, see how customers are getting to their site, and use the Yahoo wallet.
- Yahoo! Store automatically sets up the front page with the name of customers store. Then, customers must create a name and caption for the first product section of their store.
- Yahoo! Store backs up all the information and provides Secure Socket Layer technology to encrypt all credit card transactions handled through their stores.
- Each Yahoo! Store is included in Yahoo! Shopping, so customers can access their store through link at the Yahoo! Web site.
- Yahoo! Store e-commerce sites are hosted on Yahoo! Secure servers. Yahoo! Maintains the servers on a 24-by-7 basis-they keep customers store up and running 24 hours per day and seven days per week.

2.11.2.2 Comments On Yahoo! Store

- The template for the merchant site not interesting and static.
- The service of setting up the online store not free, but the merchant has to pay for the monthly fee.
- So many processes for setting up the online store at Yahoo! Store.

2.11.3 Case Study 3: CyberCash

CyberCash is one of the leaders in secure payment processing solutions for e-commerce of all sizes. CyberCash CashRegister enables e-commerce to accept credit card payments. Business must be establishing a merchant account with a financial institution. Once an account is in place, merchants can accept payments through their Web sites and transfer the funds directly into their merchant accounts.

CyberCash offers multiple payment types including credit, cash, and check including Secure Payment/SET™, CyberCoin and PayNow electronic check.

2.11.3.1 Benefits of Using CyberCash

- CyberCash maintains all of the secure servers, so merchants are not responsible for storing customer's private credit card information on their own servers.
- CyberCash uses the Secure Socket Layer and Secure Electronic Transaction protocols to secure online transactions.
- CyberCash provide a digital wallet service call Instabuy. Customers can sign up for Instabuy and use their wallet at hundreds of participating merchant sites worldwide.
- CyberCash offers the PayNow service, which gives merchants the ability to bill and collect payments online.

2.11.3.2 Comments On CyberCash

- The walletID containing sensitive data is transmitted through the Internet.
- The walletID go through Merchant's hands when not all merchant can be trusted.
- Customers need to install special software to trade using CyberCash.
- Customers need to register for a walletID before trading.

2.11.4 Case Study 4: eBay

eBay is an online auctions company in the Internet. eBay was one of the most profitable e-commerce. The successful online auction house has its roots in a 50-year old novelty item-Pez candy dispensers. Linda Omidyar, an avid collector of Pez dispensers, came up with the idea of trading them over the Internet. When she expressed this idea to her boy friend, Pierre Omidyar(now her husband), he was instantly struck with the soon-to-be-famous business concept. In 1995, the Omidyars created a company called Auction Web. The company post as many as 2 million unique auctions and 250,000 new items each day.

The impact of eBay on e-commerce has been profound. The founders took a business model that was restrictive offline and brought it to the desktops of consumers worldwide. The business model is one of few that generate a profit on the World Wide Web. By implementing traditional marketing strategies and keeping the process simple, eBay has offered a clear alternative to storefront-style e-commerce.

The auctions process begins when the seller posts a description of the item for sale and fills in the appropriate registration information. The seller must specify a minimum opening bid. If potential buyer feels this price is too high, the item may not get any bids. In many cases, a reserve price is set. A reserve price is the lowest price that the seller will accept. Seller can set the reserve price higher than the minimum bid. However, if no bid meets the reserve price, the auction is unsuccessful. Therefore, it is best to set the reserve price at the same price as the minimum starting bid. Sellers might set the opening bid lower than the reserve price to generate bidding activity.

If a successful bid is made, the seller and the buyer negotiate the shipping details, warranty and other particulars. eBay serves, as a liaison between the parties-it is the interface through which sellers and buyers can conduct business.

2.11.4.1 Benefits of Joining eBay

- People can buy and sell just about anything.
- eBay uses a database to manage the millions of auctions that it offers.

2.11.4.2 Comments On eBay

- eBay does not maintain a costly physical inventory or deal with shipping, handling or other services that businesses such as Amazon and other retailers must provide.
- eBay failure to keep businesses up and running.
- This will increase the cost and not fatal for the customers.

2.11.5 Case Study 5: E*TRADE

E*TRADE was founded in 1982 to offer online stock quotes to the nation's major investment firms. With the development of the Web, E*TRADE created a Web site (http://www.etrade.com).

E*TRADE offers two games in which you use fake "game money" to carry out stock traders or stock and options trades for those who have little knowledge about buying and selling stocks. Each player is given $100,000 in virtual trading dollars to start. Game players have access to charts, graphs and recent news articles to help them choose their investments. There is no risk of losing real money, so the players can feel free to experiment with different trading strategies. The goal of each game is, of course, to increase the value of your portfolio. The E*TRADE games are friendly way for beginners to experiment with online trading. Players compete for real cash prizes. The two players with the highest-value portfolios at the end of each trading game receive $1000 each. The trading games last one month.

2.11.5.1 Benefits of Joining E*TRADE

- Individual investors could manage their own investments without the need for brokers.
- Fast and cheap
- Consumers can buy, sell and research stocks, bonds and other securities.
- Each trade takes approximately one minute to process.

2.11.5.2 Comments On E*TRADE

- Not so much choice for merchant to manage his or her own investments.
- Merchant must pay for the service.

2.12 Summary

Normally, a system development is abstract and complex. So, a complete literature review must be carry out for gather all the information of the theories, methods and tools which are needed to develop the project. This may identify the most compatible tools or methods to be used during the development phase. Besides that, all the possibility and consideration also must take into account during the analysis for the project development.

Chapter 3: SYSTEM ANALYSIS AND METHODOLOGY

3.1 System Development Model

A synthesis of the Waterfall model has been identified as methodology to be used for the Dealership E-Commerce Package (E-Payment System).

The overall development is broken into distinct phase much like the waterfall model, with the exception that prototypes are used during the development of the e-payment system modules. The incremental aspect of the model comes in when additional functions are added iteratively to the waterfall module prototypes. Functions are added incrementally so that the framework is quickly developed and later on added with more features.

The initial stages of the development model are conducted on a general basis covering most of the e-payment system as a whole. Upon reaching the prototyping stage, individual modules are developed separately and prototyping is also conducted separately from each other. During this time, the future integration needs of the separate modules also have to be catered for and are handled during this time for future needs

Once each of the individual modules has been sufficiently developed to a reasonable stage of completeness, they are brought together for the final integration into the complete e-payment system, unifying the separate parts and forming a coherent system. Final testing is then conducted on the e-payment system as a whole. Following the conclusion of this project, the e-payment system may be further added with more modules to increase its functionality.

The advantages in using waterfall model are:

- Additional future functionalities can be add effortlessly into the system
- It makes explicit which intermediate products are necessary in order to begin the next stage

- Allow all or part of the system to be constructed quickly to verify the requirements so that problems can be solved earlier

Besides that, there are many analysis methods that are carrying out for the development of this project.

- Brainstorming
- Internet (browsing, newsgroup…)
- Try out the real e-payment system service
- Reference books
- Group discussion

The Waterfall Model as described is depicted in the following diagram.

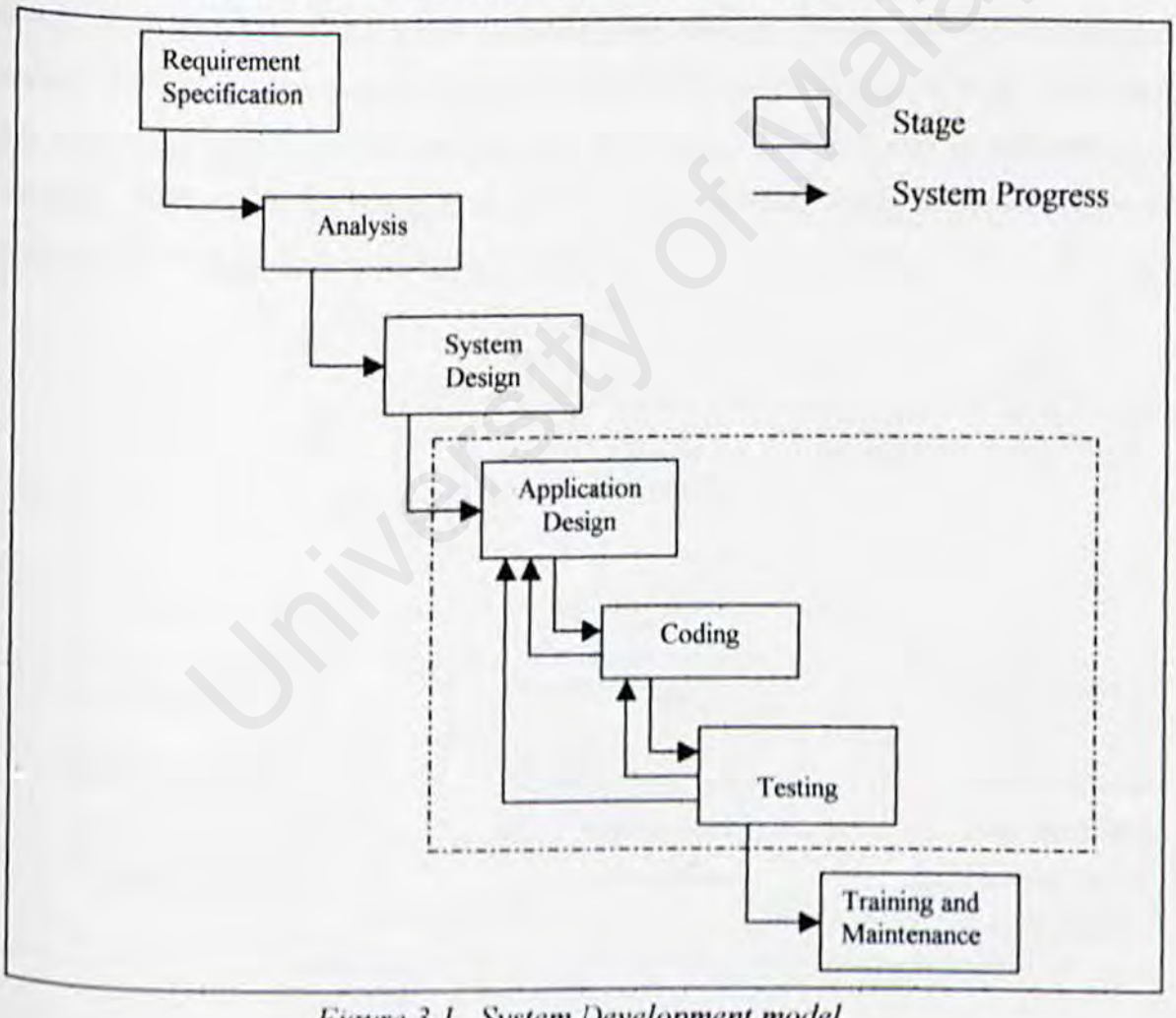


Figure 3.1 System Development model

3.2 Requirement Specifications

The requirement of the Dealership E-Commerce Package (E-Payment System) can be divided into two categories: functional requirements and non-functional requirements. Functional requirement describe how the e-payment system interact with its operating environment. On the other hand, non-functional requirements are the limitations placed on the system that narrow the choices that can be made for the implementation.

3.2.1 Functional Requirements

A functional requirement describes an interaction between the system and its environment. Further, functional requirements also describe how the system should behave given certain stimuli. The important thing is the questions addressed by functional requirements have answers that are independent of an implementation of a solution to a problem. The task on this e-payment system can be divided into three parts. The first part is focused on the customer section; the second part is on the dealer section, while the third part is the merchant bank section of the system.

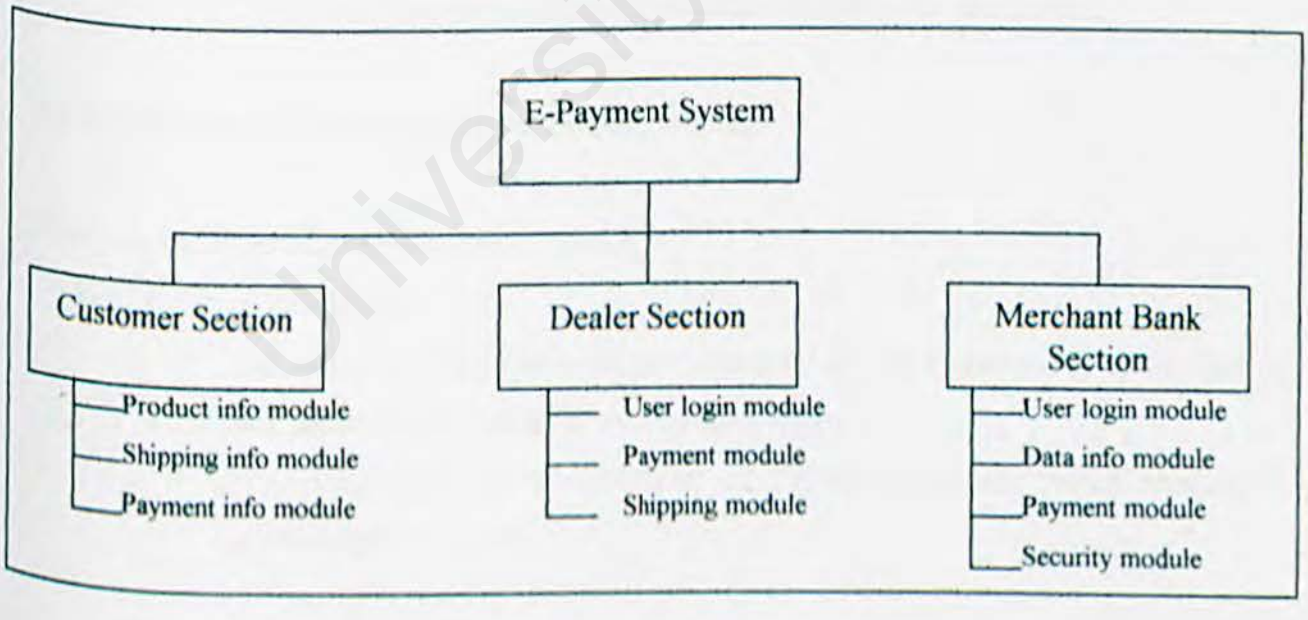


Figure 3.2: Functional Specification For E-Payment System

3.2.1.1 Functional Requirements for Customer Section

There are three modules under the customer section:

i) Product info module

- A search for the product details and description with the specific product and category product.
- Customer can make an order to the products by select the product into the shopping cart.

ii) Shipping info module

- This shipping info module provides a shipping method that can choose by the customer.
- Customer will go to next module-payment info module after the process of this module.

iii) Payment info module

- This module enable the customer choose the type of payment, like credit card or online check.
- Customer needs to submit their payment details to the dealer site.

3.2.1.2 Functional Requirements for Dealer Section

There are three modules for the dealer section:

i) User login module

- The system will examine the administrator ID and Password to make sure only the authorized user can access the system
- After validation, the administrator is allowed to choose which module he/she wished to access.

ii) Payment module

- In this module, dealer will accept the payment details that send by the customer.
- Dealer will endorse the payment and check the payment serial number.
- Dealer also will request the processing of the payment from the merchant bank.
- A confirmation of payment will send to customer after the payment is successful.

iv) Shipping module

- This module list out all the shipping method for the customer.
- The calculation of the charge of the shipping will be added into the payment amount.

3.2.1.3 Functional Requirements for Merchant Bank Section

There are four modules in this section:

i) User login module

- The system will examine the administrator ID and Password to make sure only the authorized user can access the system
- After validation, the administrator is allowed to choose which module he/she wished to access.

ii) Data info module

- This module will allow merchant bank administrator verify the account data of the customer and dealer.

iii) Payment module

- Merchant bank will process the payment and send back a statement of payment to dealer and customer.
- Merchant bank also will report to the dealer whether the payment is success or not.

iv) Security module

- All the transaction data has a digital certificate and will be authentication.
- This module makes sure all the transaction data secretly and avoids seeing by unauthorized person.

3.2.2 Non-Functional Requirements

The non-function requirements are the constraints how the development should take place. The following are keys of non-functional requirements.

i. Reliability

The entire system must to the user as a consistency and an accuracy system. The system will also have the ability of error tolerance. Problems and system failures will be prevented and minimized to enable the system to be a reliable system. The system will stable and consistent in all environments.

ii. Integrity

This system allowed only authorized user to access the system. The valid users have to log on the system by using their user password. This will ensure the integrity of data and system.

iii. Efficiency

This system will ensure efficiencies, in system execution and data storage. The simplicity of the system will enable the new user familiar with the system in a short time. This system will also enable the users handle their jobs efficiently by reducing time, manpower and other resources.

iv. Scalability

Due to the payment system and distributes nature of the project's implementation, the scalability issue can be addressed by separating the key modules. Each module can be scalability run on separate machines that can be the expanded or contracted as well as

run from within a single machine. Database scalability issues can be resolved using distributed database architecture whereas web application scaling can be addressed by increasing by additional web server or others.

v. Flexibility

As the project's implementation is based on payment technologies, it is foreseeable that newer payment technologies that can work with existing technologies will have no problem integrating in this system.

3.3 Analysis of Technological Requirements

Following the appropriation of requirements for the project, the programming languages, development tools and technologies chosen for implementation are chosen based on their ability to meet the stated requirements.

3.3.1 Hardware Requirement

- Personal computer
- At least 64 MB Ram
- At least 166 MHz processor
- 2.1 GB of free hard disk space
- 256-colour monitor capable of 800 x 600 resolution

3.3.2 Operating System

The operating system that I use to develop my e-payment system is Windows 98 because it can support Apache Web Server, MySQL, and server side Web language PHP.

3.3.3 Server Technologies

The e-payment system in the Dealership E-Commerce Package relies heavily on the server technologies used. From the analysis of the requirements obtained, several key servers from Microsoft were chosen for their ability to provide the required services within reasonable effort and cost.

3.3.3.1 Apache Web Server 1.3.14

Apache Web Server was chosen to perform as the web server in this project. The Apache Web Server is responsible for tying together the separate module, since all the application have portions requiring web transport and script execution. The final integration of all the separate modules will require all modules to be accessible through the apache web server that will be one of the base means of information flow. The reasons Apache Web Server was chosen in this project are:

- It is simple to configure and can use as well as being a powerful tool that run well on the Windows 98.
- It also supports the integration with PHP engine to run the PHP file.
- It provides a high-speed, secure platform for publishing information on the Internet.

3.3.4 Database Management Technology

Database management technology is a very important requirement in this project to enable the data to be unified in the database and can be generally accessible by the modules.

3.3.4.1 MySQL v3.22.32

MySQL was chosen because of the MySQL database system is an open source database. There are several pre-compiled distributions of MySQL for whom do not feel comfortable

compiling the source code. MySQL suited for processing databases on the Internet because of its connectivity, speed and security.

3.3.5 Web Server Scripting Language

There are several key Web server language technologies were employed to development this e-payment system. This technology was chosen for its wide implementation capability and ease of use.

3.3.5.1 PHP 4.03

PHP is chosen as the Web server language because:

- PHP is simplicity an almost natural way of using databases and platform independence.
- PHP querying a database is a simple task that can be handled in 2 or 3 lines of code.
- PHP familiar for people coming from object oriented or procedural language, like C, C++ or Java, learning the basic PHP construct will be a breeze.
- PHP can create very powerful applications that interact with a database and generate content dynamically.

3.3.6 Web Language

There are several key Web programming language technologies were employed to development this e-payment system. This technology was chosen for their wide implementation capability and ease of use.

3.3.6.1 HyperText Markup Language (HTML)

HTML is a computer language used to create Web pages. All web pages are HTML documents. An HTML document consists of text and special instructions, called tags.

HTML documents have the .html or .htm extension. The benefits of use HTML in Web pages is:

- An HTML document can be displayed on any type of computer.
- User can use uppercase or lowercase letters when typing tags.
- User can choose between several types of programs to create Web pages such as Notepad, Microsoft FrontPage and so on.
- Is easier to study and easier to understand.
- HTML can combine with other Web languages like Java Script, Cold Fusion, VB Script and others.

3.3.7 Web Browser

One of the great challenges of developing Web-based applications is the great diversity of customer-side browsers in use. The Dealership E-Commerce Package (E-Payment System) needs Microsoft Internet Explorer as the best browser.

3.3.7.1 Microsoft Internet Explorer

Microsoft Internet Explorer is chosen as a Web browser because of the following reason:

- Microsoft Internet Explorer is the easiest way to get around the Web.
- Microsoft Internet Explorer is a customizable browser.
- Microsoft Internet Explorer is the best choice for laptops.
- Microsoft Internet Explorer is safety in browsing the Web.
- Microsoft Internet Explorer can display Web pages in other languages.

3.3.8 Text Editor

3.3.8.1 EditPlus v2.10

EditPlus is an Internet-ready 32-bit Text editor, HTML editor and Programmer's editor for Windows. While it can serve as a good replacement for Notepad, it also offers many powerful features for Web page authors and programmers.

- Syntax highlighting for HTML, CSS, PHP, ASP, Perl, C/C++, Java, JavaScript and VBScript. Also, it can be extended for other programming languages based on custom syntax files.
- Seamless Web browser for previewing HTML pages, and FTP commands for uploading local files to FTP server.
- Other features include HTML toolbar, user tools, line number, ruler, URL highlighting. Auto-completion, cliptext, column selection, powerful search and replace, multiple undo/redo, spell checker, customizable keyboard shortcuts, and more.

3.4 Summary

This requirement specification and analysis part give more precise description of the functionality and the constraints on the system after the feasibility studies on the overall available technologies. It is an important phase to ensure that the project will meet the real requirement of the project and to reduce the misunderstanding and misinterpretation of the whole system.

Chapter 4

SYSTEM DESIGN

Chapter 4: SYSTEM DESIGN

4.1 System Architecture

The e-payment system is designed to leverages the traditional client/server architecture and extents it to the Internet and web technology. It was divided into three distinct applications: user application, business application and the database application. All the components were built into each tiers to fulfill its role and then tied together to form a final solution. The following diagram depicts the overall E-Payment System.

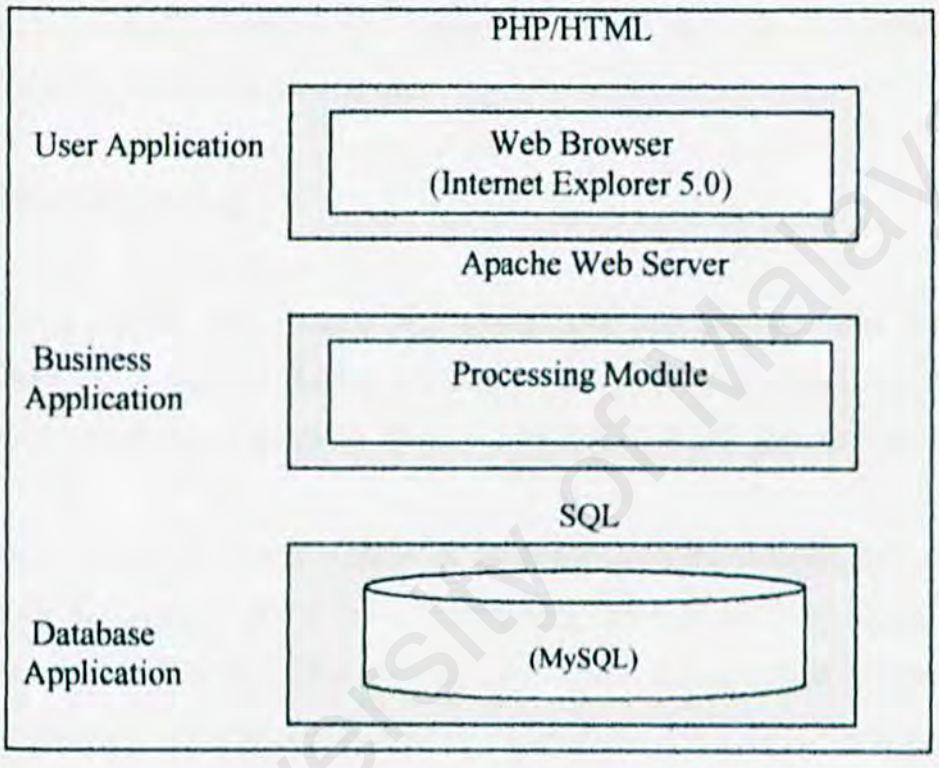


Figure 4.1: The Overview Of The E-Payment System Architecture

For the user application, the Internet explorer 5.0 is the web browser for the user. All the input will be process by using HTML and PHP to publish all the data in this level. In this level there have certain components to gather input variables or query for analysis. There is also a component to display the results of the analysis to the difference system users.

For the business application, there is a process, which perform the analysis. This tier resides on the store back office. Request and response are control by written code

specifying its business rules. For the administrator, all data in this level can do the add, edit, and delete purpose by interacting with the database.

For the database application, a repository of relevant data is stored in the MySQL. It is available to support the work performed the analysis engine. While, all the file systems will be coordinate by the Apache Web Server.

The final integration of the separately developed modules depends heavily on each module being developed with adherence to this overall architecture. Compliance to this architecture is ensured in each module during its development by providing the appropriate setup according to the architecture design.

4.2 System Structuring

A large system can be decomposed into sub-systems that provide some related set of services. Thus, this system structuring is the initial design process of identifying these sub-systems and establishing a framework for sub-system control and communication.

The system is structured into a number of principle sub-system is an independent unit. Decomposing the system into a set of interacting sub-system is an important phase. Structure chart is used to depict the high level extraction of a specified system. The usage of structure chart is to describe the interaction between independent sub-systems.

The e-payment system is divided into three major components: Customer Section, Dealer Section, and Merchant Bank Section. The details of each section are represented in the structured chat.

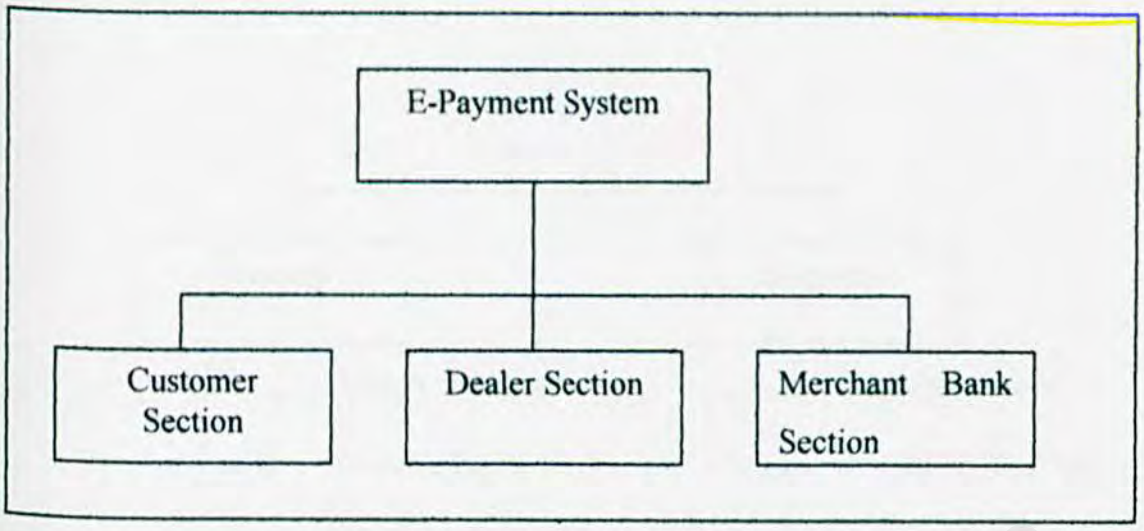


Figure 4.2 Structure Of The E-Payment System

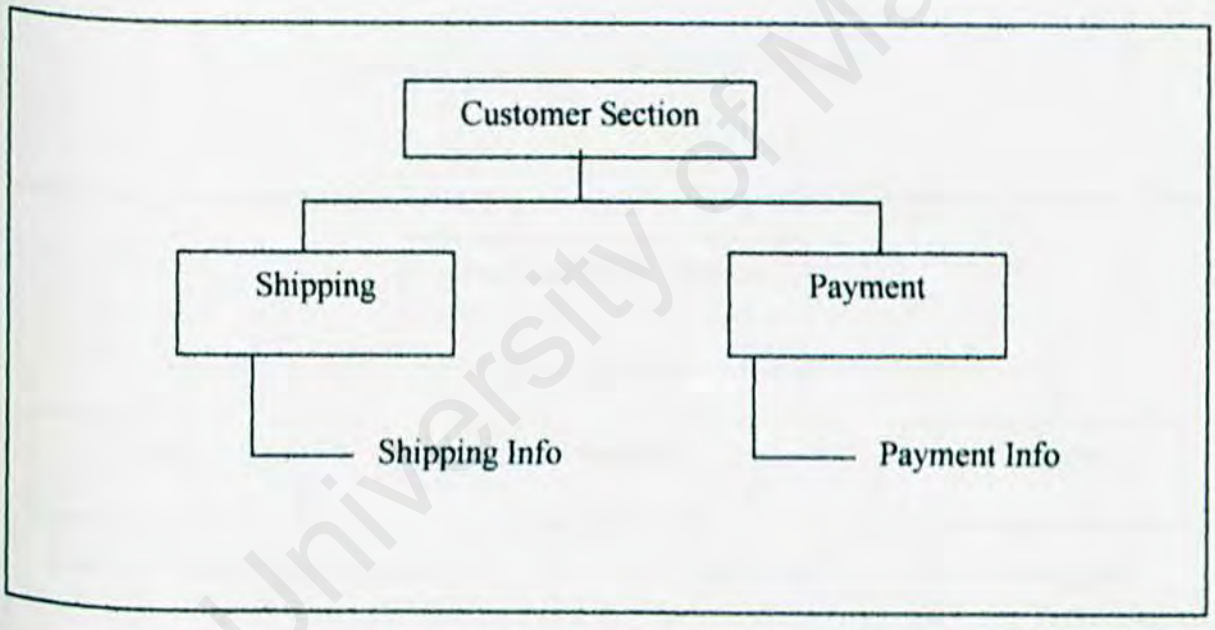


Figure 4.3 Structure Of Customer Section

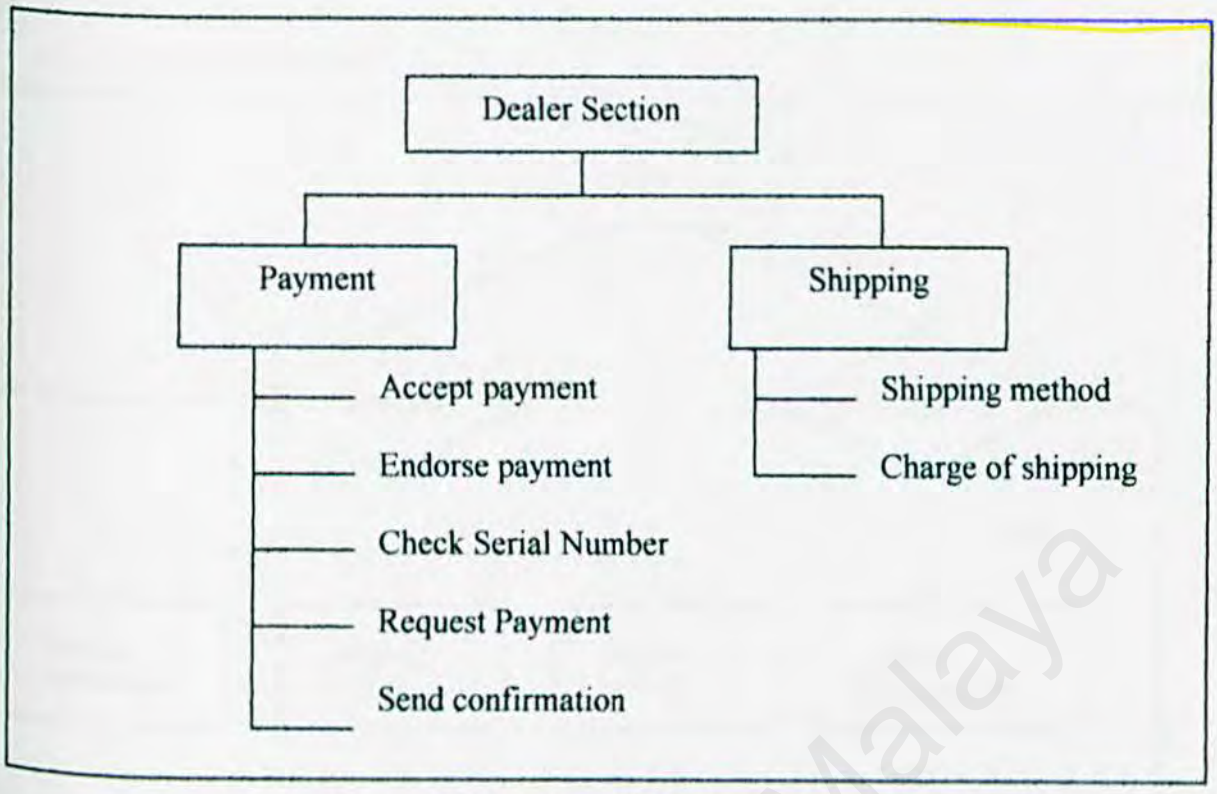


Figure 4.4 Structure Of Dealer Section

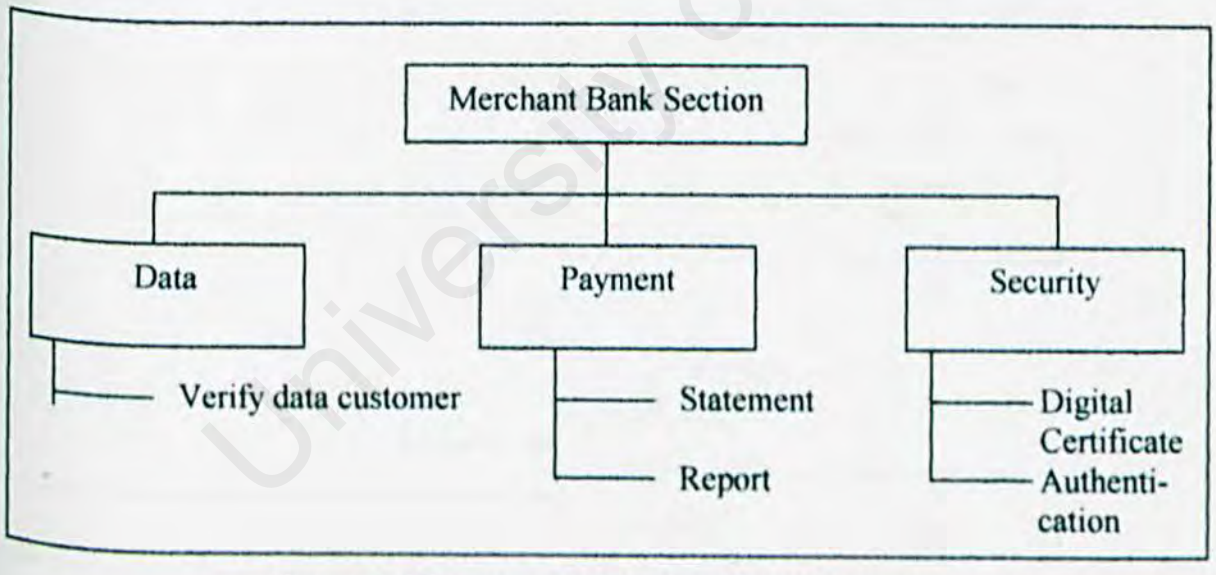


Figure 4.5 Structure Of Merchant Bank Section

4.3 System Flow Chat

i. Customer Section

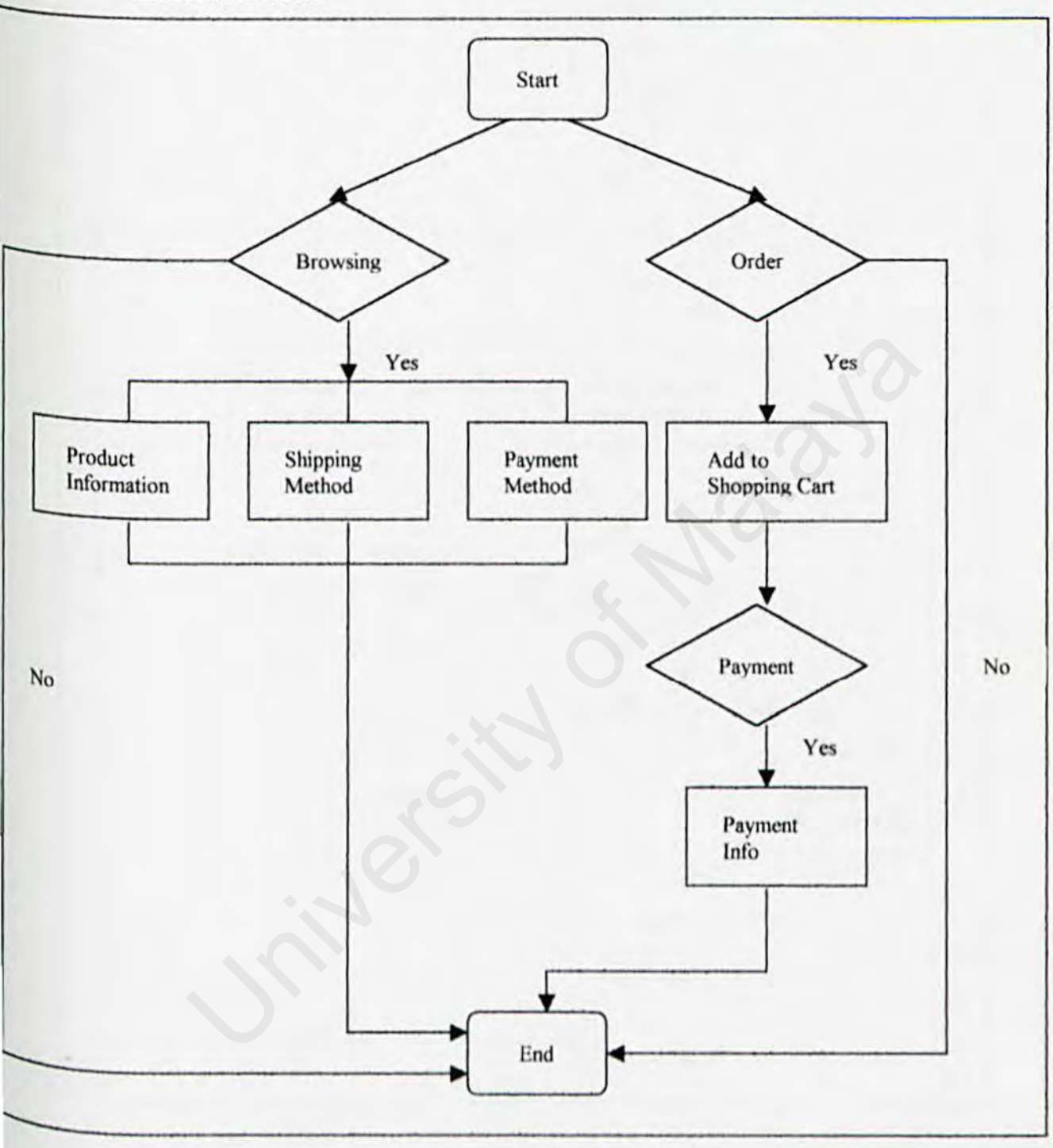


Figure 4.6 Flow Chart of The Customer Section

ii. Dealer Section

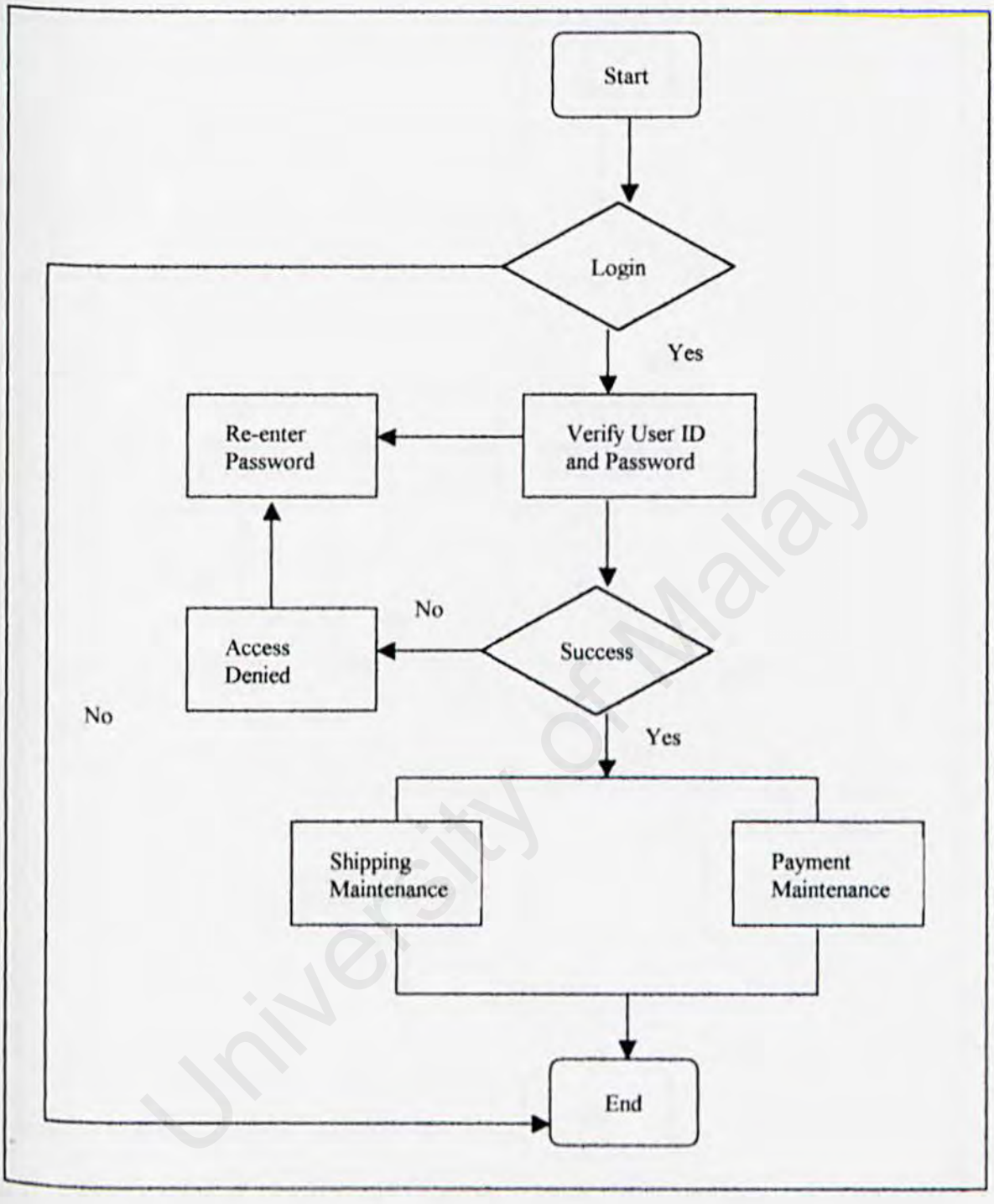


Figure 4.7 Flow Chart of The Dealer Section

iii. Merchant Bank Section

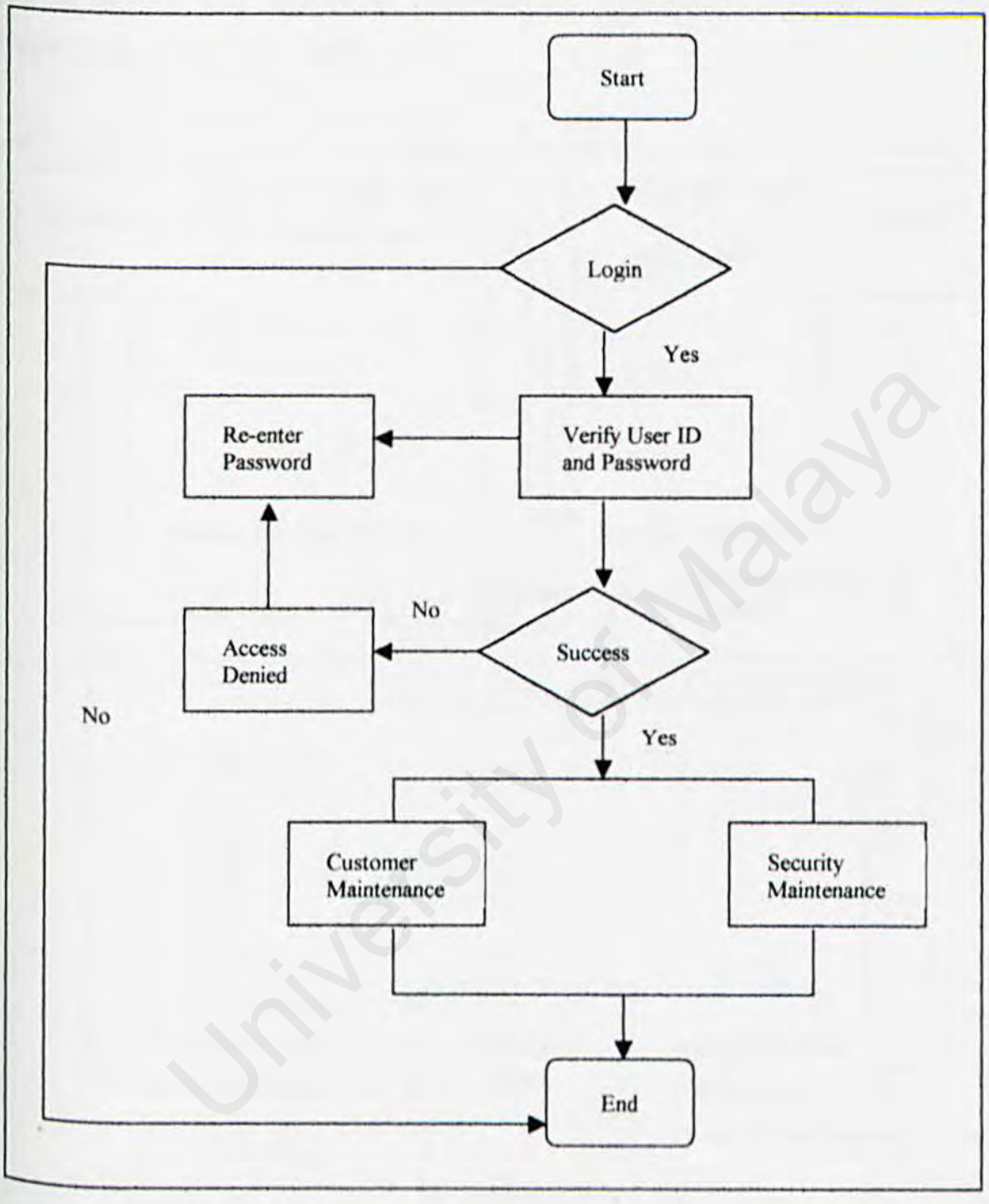


Figure 4.8 Flow Chart of The Merchant Bank Section

4.4 Data Flow Diagram

Overall, the data flow diagram of the Dealership E-Commerce Package (E-Payment System) is shown in figure below.

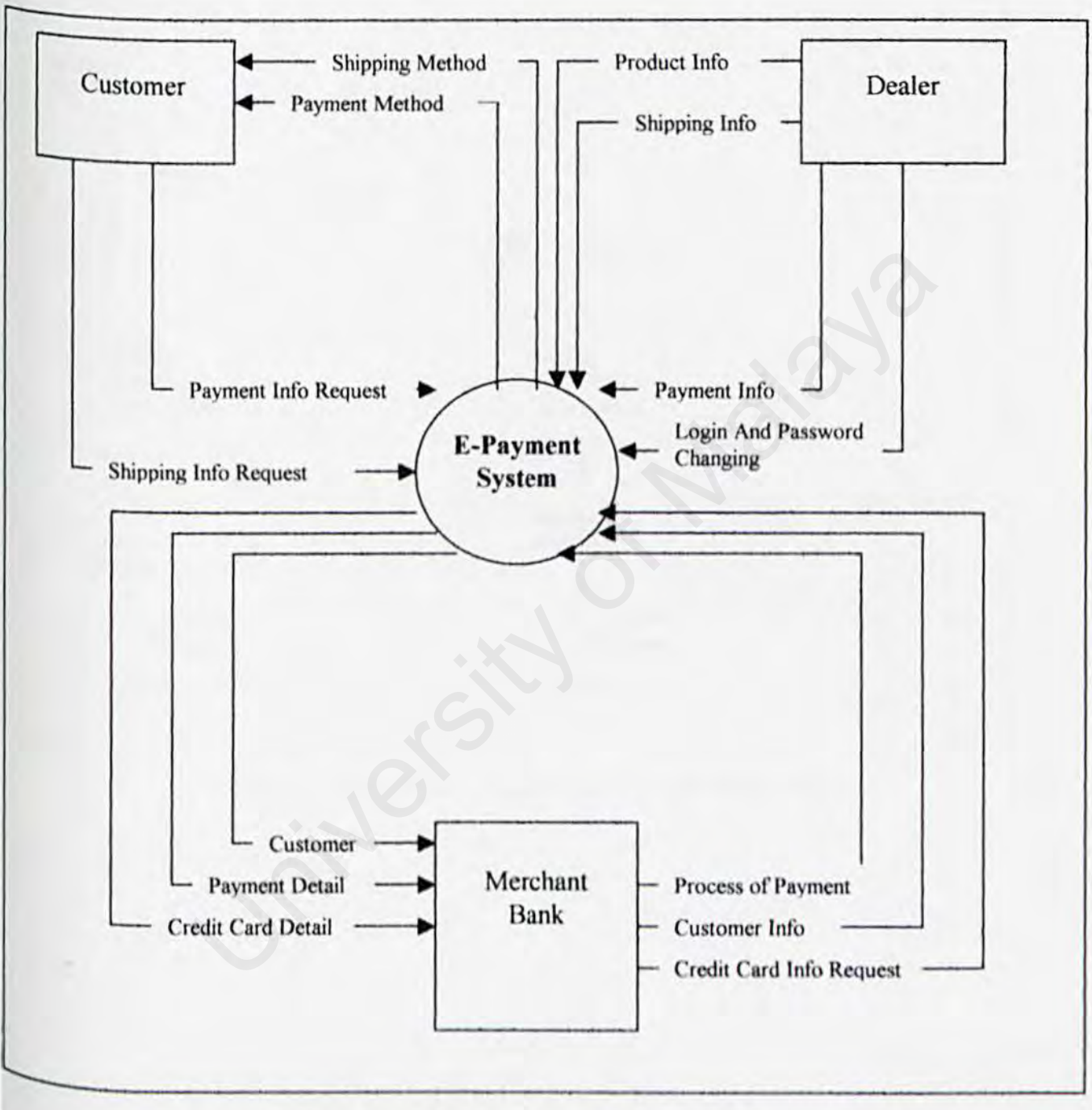


Figure 4.9 Data Flow Diagram For The Overall E-Payment System

i. Customer Section

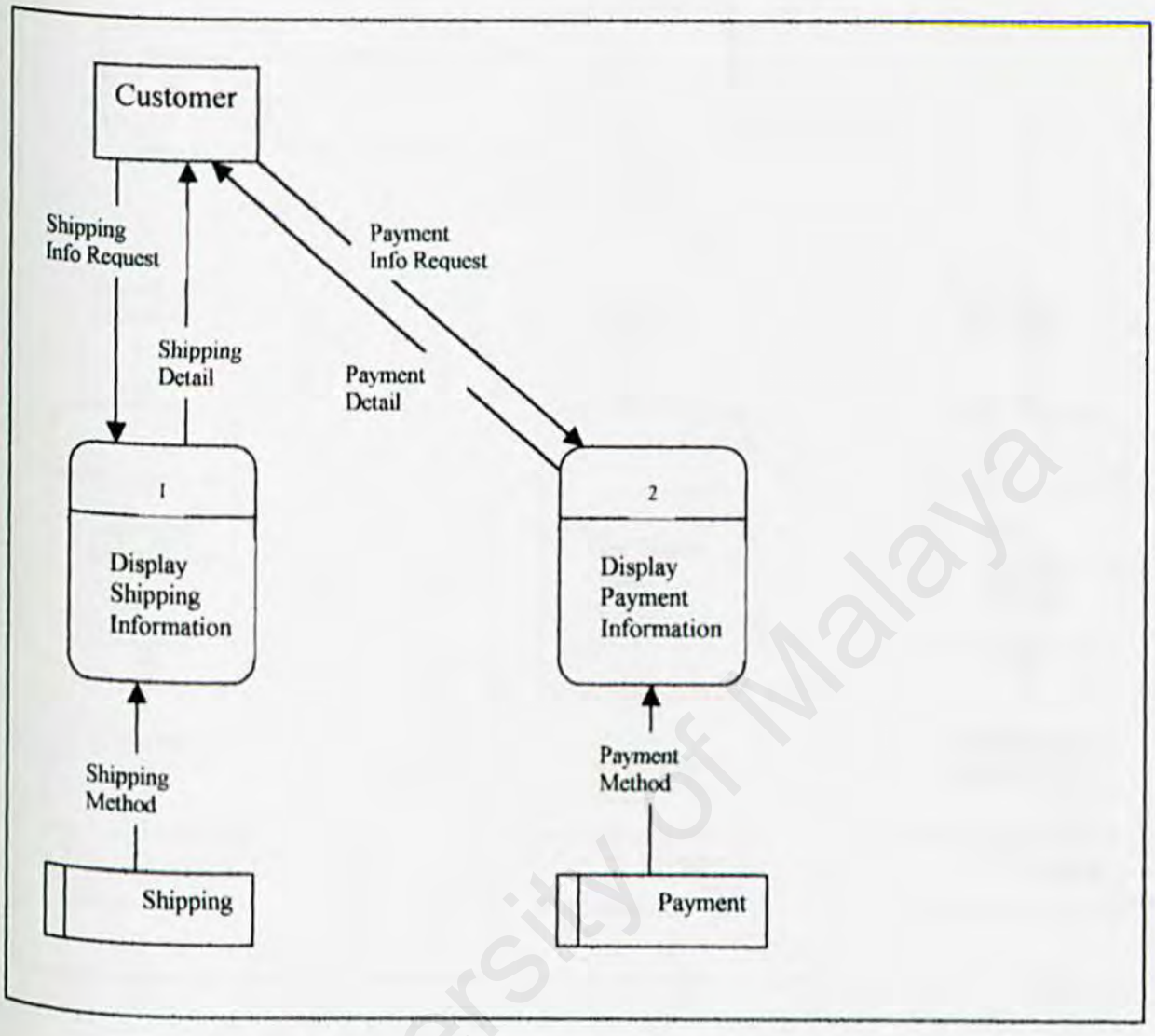


Figure 4.10 Data Flow Diagram For The Customer Section

ii. Dealer Section

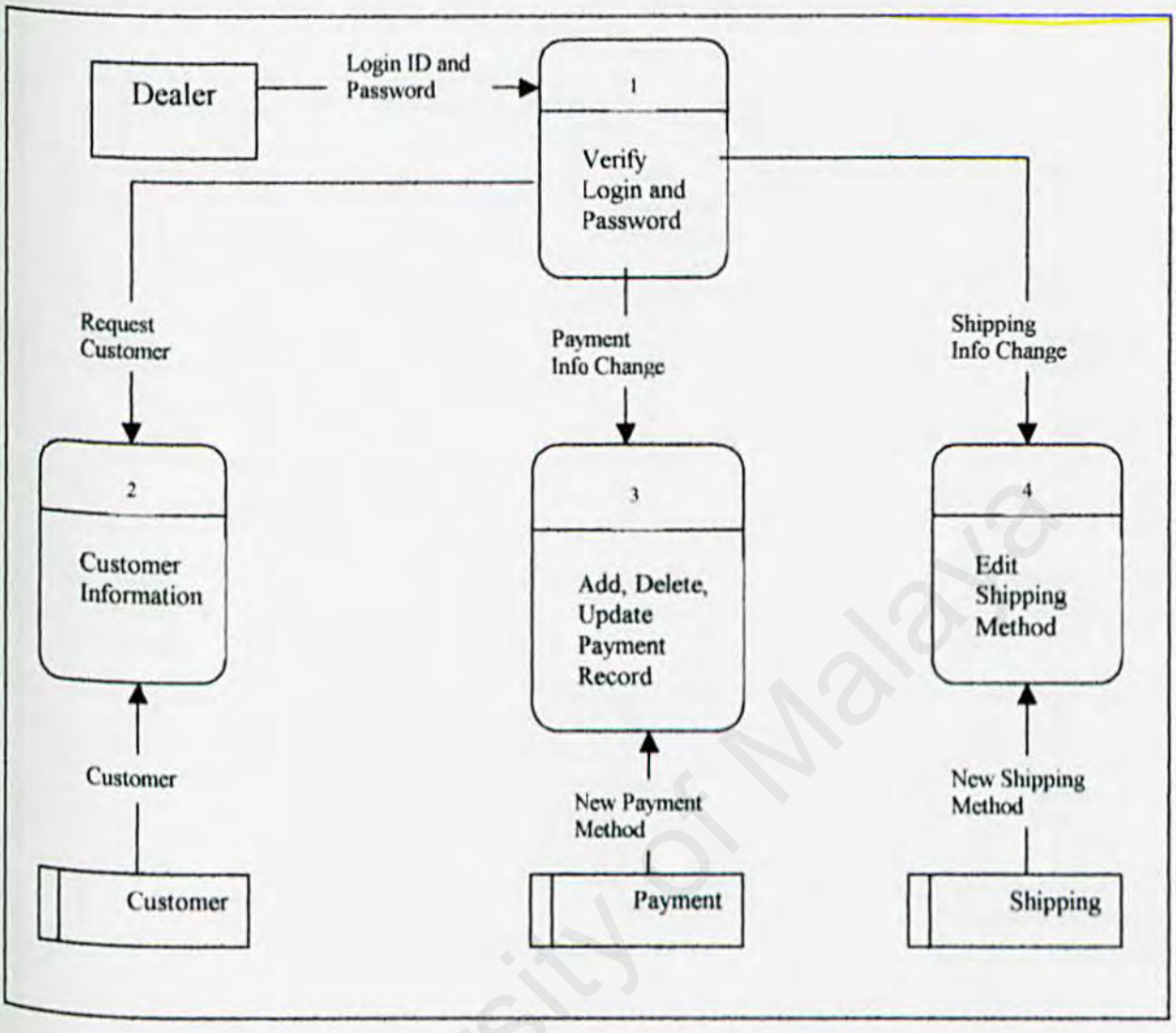


Figure 4.11 Data Flow Diagram For The Dealer Section

iii. Merchant Bank Section

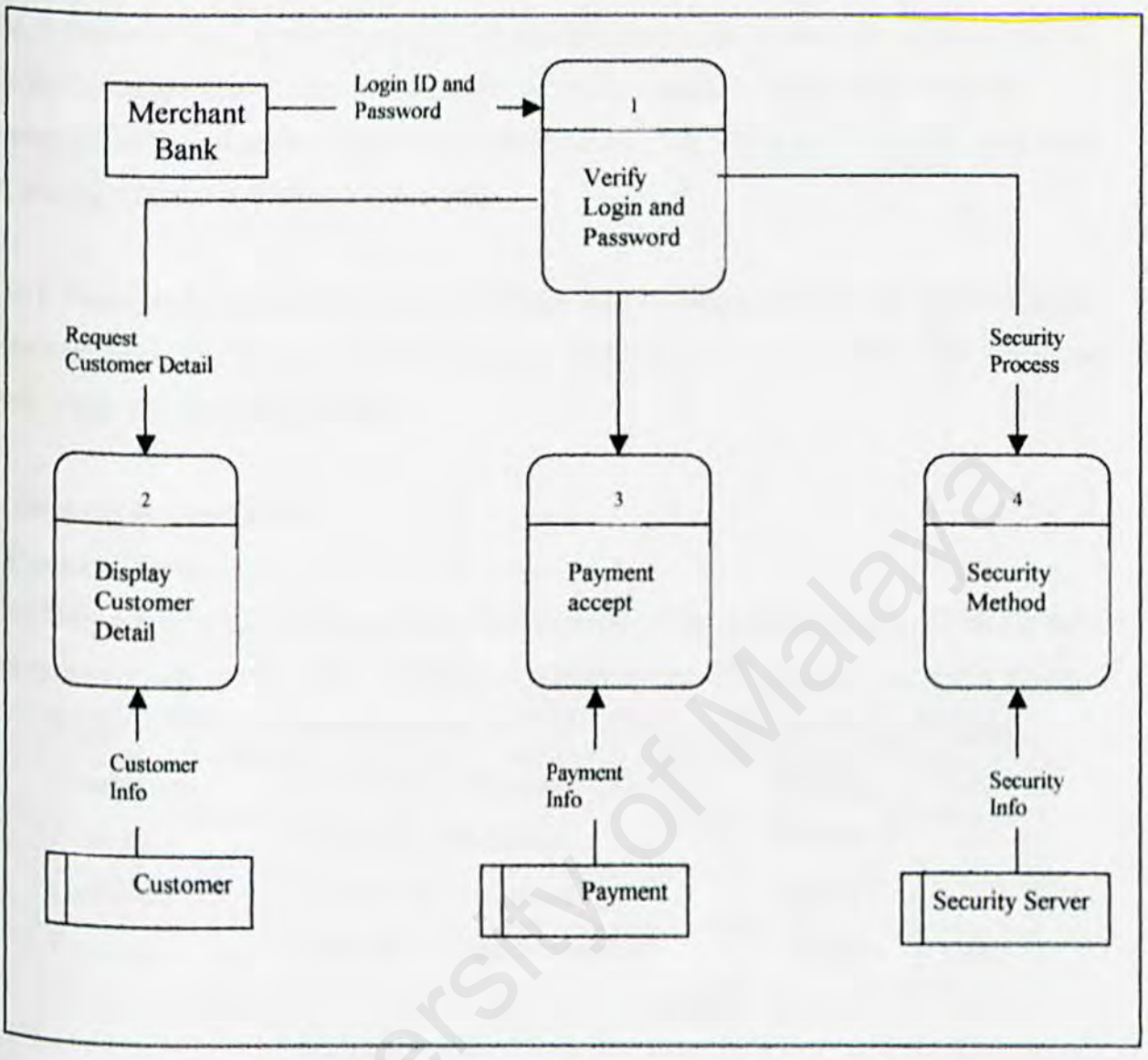


Figure 4.12 Data Flow Diagram For The Merchant Bank Section

4.5 Database Design

The E-Payment System uses the relational database model in its database implementation. Relational database is a collection of tables where the data are stored. Each of the table is a matrix consisting of series row/column intersections. The tables are related to each other by sharing a common entity characteristic.

The E-Payment System develops two databases, one for dealer site and one for simulation merchant bank site. These two databases are independence of each other. The design of each tables are described as follow:

1. Database for Dealer Site

i. Customer Table

This table contains all the records about the customer. The information stored here enable the system recognizes the entire customer shopping record. The primary key is UserName.

Field	Description	Data Type	Length
UserName	Primary Key Customer Username	Varchar	40
FirstName	Customer's First Name	Varchar	40
LastName	Customer's Last Name	Varchar	40
Password	Customer's Log In Password	Varchar	40
ConfirmPassword	Customer's Log In Confirm Password	Varchar	40
EmailAddress	Customer's Email Address	Varchar	40
Address	Customer's Address	Varchar	40
PostCode	Customer's Post Code	Varchar	20
City	Customer's City	Varchar	20
State	Customer's State	Varchar	20
Country	Customer's Country	Varchar	20
HomePhone	Customer's Home Phone	Varchar	20
OfficePhone	Customer's Office Phone	Varchar	20
HandPhone	Customer's Hand Phone	Varchar	20

Table 4.1 Customer Table

ii. Transaction Table

The Transaction Table contains all information on the customer transaction details

Field	Description	Data Type	Length
UserName	Primary Key Customer's Username	Varchar	40
Item_No	Product's Item No	Varchar	20
Title	Product's Title	Varchar	60
Price	Product's Unit Price	Float	
Quantity	Quantity of Product	Integer	11

Table 4.2 Transaction Table

iii. Account Table

This table is used to record the customer's shipping information and the total payment for the transaction. The primary key is UserName.

Field	Description	Data Type	Length
UserName	Primary Key UserName	Varchar	40
Name	Recipient's Name	Varchar	40
Address	Recipient's Address	Varchar	100
EmailAddress	Recipient's Email Address	Varchar	30
Phone	Recipient's Phone No	Varchar	20
Total1	Total for Transaction	Float	
Total2	Final Total	Float	
ShippingCharge	Shipping Charge	Float	
Shipping	Shipping Method	Varchar	40

Table 4.3 Account Table

iv. Shipping Table

This table is used to store the detail information about the shipping method. The primary key is ShippingID.

Field	Description	Data Type	Length
ShippingID	Primary Key Shipping ID	Integer	10
Shipping	Shipping's Name	Varchar	40
Charge	Shipping's Charge	Float	

Table 4.4 Shipping Table

v. Payment Table

This table is used to store the detail information about the payment method. The primary key is PaymentID.

Field	Description	Data Type	Length
PaymentID	Primary Key Payment ID	Varchar	40
Payment	Payment's Name	Varchar	40
Image	Credit Card's Image	Varchar	40

Table 4.5 Payment Table

2. Database for Simulation Merchant Bank Site

i. Customer Table

This table contains all the information about the customer. It is includes the date and time of transaction of customer detail. The primary key is ACCID.

Field	Description	Data Type	Length
ACCID	Primary Key Account ID	Varchar	40
Name	Customer's Name	Varchar	40
Sex	Customer's Sex	Varchar	20
NRIC	Customer's IC Number	Varchar	40
JobTitle	Customer's Job Title	Varchar	40
Address1	Customer's Address	Varchar	40
Address2	Customer's Address	Varchar	40
PostCode	Customer's Post Code	Varchar	20
City	Customer's City	Varchar	20

State	Customer's State	Varchar	20
Country	Customer's Country	Varchar	20
HomePhone	Customer's Home Phone	Varchar	20
OfficePhone	Customer's Office Phone	Varchar	20
HandPhone	Customer's Hand Phone	Varchar	20
TransactionDate	Date when customer do transaction	Date	
TransactionTime	Time when customer do transaction	Time	
PaymentAmount	Transaction's Amount	Float	
AccountBalance	Customer's Account Balance	Float	
CreditCardType	Customer's Credit Card Type	Varchar	40
CreditCardNo	Customer's Credit Card Number	Varchar	20
CCExpiredMonth	Customer's Credit Card Expired Month	Varchar	40
CCExpiredYear	Customer's Credit Card Expired Year	Varchar	40

Table 4.6 Customer Table

4.6 User Interface Design

The user interface for the E-Payment System has also been given top priority beside the functionality design. For the customer, office and administrator, the development will be the web based, PHP and HTML will ultimately be the presentation tools used. At this point in the project, the interface designs are in the preliminary stages. A definite interface design will only emerge after some degree of modification and feedback, which will be done iteratively during the implementation phase.

At this early stage, the user interface was decided to be easy for the users to understand and navigate. The design of the interfaces are followed the guidelines as below:

- Strive for consistency

  The interface design is stress on the consistency format for command input, data display, menu selection and placing the control objects.

- Provide information feedback

This may let the system user to know the detail in processing stage in the system.

- Provide error prevention and simple error handling

  The system must enable the user to take the corrective action once an error has been recognized. Beside that, it must also protect itself from user error that might cause it to fail.

- Reduce the short-term memory load

  The system users are not required to memorize the information from screen to screen during browsing or reservation process.

- Provide reverse action

  It may allow the user to return to the previous page

- Provide Confirmation and Verifying Message

  It provides a confirmation process that asks for verification of any non-trivial destructive action such as update record or deletes record.

There are a few prototype user interfaces that give a brief idea of the user interface design for the customer section, which use the Internet Explorer as their browser. The advance design will be develop during implementation part.

4.7 Summary

System design is a critical part for the whole project. A good design is a key to successful software project. For the system design in this project development, it covers a range of solutions with the difference combination of hardware, software and human operation. The solution chosen in this system design phase is the most appropriate technical solution that meets well with the system requirements. The design in this project development will translate all the requirements into the system characteristics and give a clear picture of the whole project.

Chapter 5

SYSTEM IMPLEMENTATION

Chapter 5: SYSTEM IMPLEMENTATION

System implementation is a process that converts the system requirements and design into program codes. This phase at time involves some modifications to the previous design.

5.1 Customer Section

There are four main modules in the customer section. The program development for the coding phase had been done based on the module functionality. The four modules in the customer section are login module, shipping module, payment module, and logout module.

5.1.1 Login Module

This login module is used to avoid unauthorized customer from accessing this system. At first, the customer login name and password will be checked with the database whether is a valid customer.

The coding process in this module was integration of the HTML and PHP together in one file and the file is save as .php file type. It is needed to add a specific header in the every file before start with the PHP tag.

<? php
?>

5.1.2 Shipping Module

For this module, the customer will ask to choose one of the shipping methods in the selection list. Then, the information will be retrieved from database for the related customer request. Select list is an input element that allows the customer to choose from a list of options. The total payment will be count after the shipping method is choosing and the charges of the shipping will be add into the total payment. The concept used in this module is it has a dynamic selection option, which the value in the option was selected from database. So, the customer will always expose to the up to date information.

According to this, it is important to measure the successful of the database connectivity before the SQL statement can be implemented for query the data.

For the database connection, the MySQL has to be downloaded first from the available website. The connections between PHP application and database in MySQL can be manipulate with imported package of PHP Triad, which contains classes and interface to invoke database connection.

5.1.3 Payment Module

After choosing the shipping method, the customer will be direct to the payment method page. For this module, customer can choose the payment method. The authentication of the credit card will be made if the customer chooses the credit card as his payment method. A confirmation page will display for the customer to inform that the process of the payment will be made after the credit card is authenticate.

5.1.4 Logout Module

This module is for customer log out from the system. Customer will return to the log in page.

5.2 Dealer Section

There are only have seven module in the merchant bank section.

5.2.1 Login Module

This login module is used to avoid unauthorized user from accessing this system. At first, the administration login name and password will be checked with the database whether is a valid administration.

5.2.2 Shipping Module

In the shipping module, dealer can choose any type of shipping method that will then upload at their e-commerce Web site. Dealer can decide how much the charge for the shipping method they like. Dealer also can edit the shipping method that they already add in the store front office. Beside that, they also can delete the unwanted shipping method. Add new shipping method also allow for the dealer.

5.2.3 Payment Module

The function in payment module almost same with the function shipping method. Dealer can add the payment method in the list that given by the company. They can delete the payment method after they add it. But, they are not allowed to add the payment method that already exists.

5.2.4 Customer's Details Module

In this module, dealer can view the customer log in details. All information that store in the database can view by the dealer through the link.

5.2.5 Customer's Transaction Module

The record of the customer transaction will be display for the dealer to check whether what shipping method is choose by the customer. Beside the shipping method, the dealer also can view the item in the customer shopping cart. The total payment including the shipping charge also will be display in this module.

5.2.6 Search Customer Module

This is the second last module in the dealer section. Dealer can search any customer by the keywords insert by the dealer. From the result found, dealer also can view the customer transaction records through the link.

5.2.7 Logout Module

This module is for dealer log out from the system. Dealer will return to the log in page.

5.3 Merchant Bank Section

There are only have three module in the merchant bank section.

5.3.1 Login Module

This login module is used to avoid unauthorized user from accessing this system. At first, the administration login name and password will be checked with the database whether is a valid administration.

5.3.2 View Record Module

Administration of the merchant bank can view the record of the payment after the customer doing the transaction. The record about the payment amount and the transaction date and time of the transaction also will be display.

5.3.3 Logout Module

This module is for administrator of the merchant bank log out from the system. Administrator of the merchant bank will return to the log in page.

5.4 Summary

Nearly all the design phases that have been presented to this point are directed toward a final objective that needs to translate representation of software into a form that can be understood by computer. Overall, the primary goal of this phase is to produce a simple, clear source code with internal documentation that will ease the processes of a verification, debugging, testing, modification and further enhancement.

Chapter 6: SYSTEM TESTING

Testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. The system has undergone 3 stages of testing. They are unit testing, module testing and integration testing.

6.1 Unit Testing

Unit testing is done to uncover errors in each module. In this system, each module is coded and tested separately. Functions and procedures in each module are examined carefully for errors after coding. If they are found to be error free after manual examination, they are computed and run with test date to search for other errors.

For this system, unit testing is done concurrently with the development phase. For example, the payment module has the capability imposed into it to validate the credit card after the customer chooses this payment method. This module has some other functions such as validation and presenting output or error messages. Each of these functions are reviewed and checked separately. Then the sub-module is re-tested to ensure the functions presented are desirable.

6.2 Module Testing

6.2.1 Customer Section

6.2.1.1 Shipping Module

To implement the module testing, the following steps were undergone carefully. Below is one of the examples of the module testing. To test the shipping module, the customer must to select the shipping method.

After click the shipping method, the total payment page will show. The total payment is total prices for items and the shipping charges. After the process, a page about the shipping details will display for customer fill in. To make sure that the shipping record and the data

for the shipping details that key in by the customer will be insert into the database, I will go through the database table. The record in the account table is shown that the data is inserted into database successfully.

6.2.1.2 Payment Module

After choosing the shipping method, customer can choose the payment method from the payment page. If the customer chooses the credit card as his payment method, the form that need customer to key in all the information of the credit card will display. After customer key in all the details, the dealer will inform that the transaction will be made after the authenticate of the credit card.

If the mandatory field not fills in by the customer, the error page will be display to inform the customer. For the incorrect information about the credit card, the error page also will display for customer to fill in again.

If the customer choose the cheque or bank draft or money order as his payment method, the information that need to write at the back of the cheque or bank draft or money order will display.

If the customer chooses the cash on delivery as his payment method, his just need to do the payment after the items is sent to him.

The thank you page will display after all the transaction is complete.

6.2.2 Dealer Section

6.2.2.1 Shipping Module

Dealer can add, edit, and delete the shipping method in the shipping module. The selected shipping method will be shown in the store front office. Dealer can key in what shipping method and charge they like. To make sure that the shipping record is added into the

database, I will go through the database table. The record in the shipping table is shown that the data is inserted into database successfully.

The edit shipping method page will display when the dealer click on the edit link. To make sure that the shipping record is change in the database, I will go through the database table. The record in the shipping table is shown that the data is updated into database successfully.

To delete shipping method, dealer just needs to click on the delete link. To make sure that the shipping record is deleted from the database, I will go through the database table. The record in the shipping table is shown that the data is deleted from database successfully.

6.2.2.2 Payment Module

Dealer can add and delete the payment method in this module. Dealer can add the payment method in the list that given. To make sure that the payment record is added into the database, I will go through the database table. The record in the payment table is shown that the data is inserted into database successfully.

To delete the wanted payment method, dealer needs to click on the delete link. To make sure that the payment record is deleted from the database, I will go through the database table. The record in the payment table is shown that the data is deleted from database successfully.

6.2.2.3 Customer's Details Module

Dealer can click the link at the customer's name. The customer details will be display after the dealer clink on the customer's name.

6.2.2.4 Customer's Transaction Module

Dealer can view the shipping method and the total payment of the customer from the link. The transaction record of the customer will be show like above.

6.2.2.5 Search Customer Module

Dealer only has to key in the keyword to search the customer. Dealer can view the customer's transaction records from the result of searching. The records of the customer's transaction will display after dealer click on the button.

6.2.3 Merchant Bank Section

6.2.3.1 View Record Module

This module is to allow administration of the merchant bank to check whether the transaction of the credit card is successful or not. It is to make sure that the payment transaction can be made after the customer fill in all the correct details of the credit card.

6.3 Integration Testing

There is an example of the integration testing shown in below. It tests for the combination of the individual components that are working together.

6.3.1 Shipping Module

The shipping module in store back office is for dealer adds the shipping method that will be shown in the store front office. Edit the shipping method also will cause the changes for shipping method in store front office. Delete the shipping method will make the shipping method disappear from the store front office.

6.3.2 Payment Module

The function in the payment module in the store back office almost same with the shipping module in store back office. Function adding the payment method will be display the payment method in the store front office. The payment method in the store front office will be removed by deleting the payment method at the store back office.

6.4 System Testing

The last testing procedure is the system testing. System testing is difference from unit testing and integration testing. System tests study all the concerns issue and behaviors that can only be exposed by testing the entire integrated system or major part of it. One of the system testing that had undergone are as stated below:

i) Security Testing

The security testing is to verify the protection mechanism in the system against improper penetration. The system security is tested as three differences way as below:

a) Every users have to login to the system before accessing into this web page. After the testing, it found that if an unauthorized user try to access to the web page with the wrong login name and password, the error page would be shown. If a valid user key in with the wrong number, this system will also prompt with the error message.

b) I also found that if users know the actual location of the system application file, they still prohibited from accessing the page without logging in to the system. They will prompt to the system login page.

c) The user with the administrator privilege will allow accessing to the administrator task in this system. An error page will prompt to users with lower privilege if they are trying to access to this page.

6.5 User Testing

After the unit testing, module testing, integration testing, and system testing, I launch the beta version of the system in local host to other user for testing purpose. This is to identify the fault that may incur in any other unexpected condition. The testing involved with random data in random situation. From the testing, I get some feedback from the user. This feedback from the users and their different perspectives and ideas provide important information about the usability and reliability and future planning of the system.

Some page and function have been added and improved after the user 's comment.

- For page after customer fill in the credit card details, it will display a page contains all the customer transaction. This is for customer confirm all the information before continues the processing.
- There must display the customer log in name for every page to make the customer know who is logging in now.

6.6 Summary

Generally, the main objectives of the project as describes earlier have been achieved. The system is able to handle the tickets reservation procedures for the customers. Besides that, it can handle and maintain the database for the administrator. This system also provides safeguard to prevent the unauthorized users from accessing or modifying the system or database.

Chapter 7

YSTEM EVALUATION AND CONCLUSION

Chapter 7: SYSTEM EVALUATION AND CONCLUSION

7.1 Problems Encountered And Their Solutions

Research and studies through Internet are really an important experience for me in developing this application. The following are some of the major problems encountered from the beginning through the end of the system development process.

7.1.1 Difficulties In Choosing A Programming Language And Tools

There are some software tools available in the market that can be used to develop an e-payment system as stated in previous chapter. Choosing a suitable tool was a critical process as all tools have their own strengths and weakness. In addition, the functionality and the usability of the required tools for the development were the major consideration.

In order to solve this problem, trying to install and set up the available tools has been carried up to compare for their strength and weakness. By this way, the suitable tools that can support all of the requirements of this application can be choosing. The information in the Internet also helps me a lot in making up the decision.

7.1.2 Inexperience In Using Programming Language

Since there was no prior knowledge in PHP, there was an uncertainty on how to organize the structure and codes during the coding process. These new programming language was never learned before and to implement such application requires a fair grasp of the language.

Although it took some time for me to learn the new language, choosing to program in PHP proved to be a wise move. Most of the problems faced were manageable through surfing the Internet for the related materials and referring to the reference books. Discussion with group members and course mates especially those who have used the same programming

language was a great help. A more efficient method was through trial and error during the coding phase.

7.2 System Evaluation

Evaluation was implemented more than simply comparing obtained data with expected information. It was related to user environment, attitudes, information priorities and several other concerns that are to be considered carefully before effectiveness can be concluded. At all phases of the system approaches, evaluation is a process that occurs continuously, drawing on a variety of sources and information.

The role of evaluation phase in the development of this software was determine

- The extent to which the expected outcome have to be realized
- The perspective value of the process where extraneous factors were taken to consideration.

7.2.1 Evaluation Technique

This section explains techniques used to conduct the evaluation at varying levels throughout lesson design and development. These techniques are:

1) One to one evaluation

It was conducted extensively during the initial information design and development. The procedures were informal and were mainly used to identify potential major problems associated with the planned information design.

2) Small group evaluation

It was implemented when the system was nearly completed. The reasons was to determine

- Information effectiveness
- Acceptability of the information

- The appropriateness of the materials and strategies employed
- The extend to which the organization complied with the constraints identified during need assessment

3) Field test Evaluation

This evaluation was carried out when the information system was believed to be of the final draft quality. If problems were identified, additional changes may be made. However, The informal evaluations conducted at this point should ensure that the information system is completed or minimal changes will be required.

7.3 System Strengths

7.3.1 Provide A E-Payment System For The E-Commerce Web Site

This dealership e-commerce package (e-payment system) provides users ability to access information through Web site. It also provides another alternative for users to make the payment. This means the e-commerce Web site will have more efficient customers' services.

7.3.2 Simple And Easy Used System

A simple and easy used system was created to save the users learning time. The user will get use to the system in a very short time and do the transaction anywhere and anytime. All directions and user guides for the system are clear and easy to understand.

7.3.3 Custom Password Validation

A custom password-authentication system is created to prevent unauthorized users from accessing the page that they don't have permission to view. More importantly, the authorized users are prohibited from accessing the functionality, which is out of their privilege.

7.3.4 System Security

All customers have to sign in with their own username and password before they can do the shopping. Furthermore, even if the users know the actual location of the system application file, they are still prohibited from accessing the page without logging in to the system.

7.3.5 Friendly User Interface

This system has a friendly user interface. Graphic User Interface (GUI) components are used to minimize the user actions when performing certain task. The learning curve is foreseen to be short and a user should be able to use the system within minutes.

7.4 System Limitations And Future Enhancements

Nothing is perfect. No doubt this system contains some omissions and inaccuracies. Despite its futures, the system can be further improved and enhanced to include more features and functions to fully realize the advantage of this reservation system.

7.4.1 Integration In The Real Environment

For the whole development of this e-payment, the testing only has been done on the local host. Unfortunately, the real performances after the integration with the gateway and real environment of e-commerce are still untested. More improvement and correction for the system performances such as response time and functionality can be carried out in future to provide a more user-friendly system for application users.

7.4.2 Unable To Provide More Services

The e-payment system for this Dealership E-Commerce Package unable to provide more services to the customer. Customer cannot print out the receipt and slip after the

transaction. This is because no connection to the printer. Beside that, customer cannot pay by phone check because unable connect to telephone. This is the new and famous e-payment system provide by other e-commerce Web site. These service faster to transaction a payment.

7.4.3 Security

Not full security will be provide for the payment transaction because cannot develop the security like the real payment system, such as Security Socket Layer (SSL) protocol and Secure Electronic Transaction (SET). I cannot download or using this protocol because its need registration.

7.5 Summary

This is the last phase in the system development. It is an evaluation and review process for the end system. The evaluation will help the developer to understand more about the system strengths and limitations. Then, a more complete and comprehensive system can be developed in the future enhancement.

7.6 Conclusion

The dealership e-commerce package (e-payment system) is a common system in one e-commerce Web site. Although development of the whole system is not an easy task because various objectives has been targeted and many new technologies have been involved, but it still can be considered as a contemporary effort to achieve the goals. Overall, this project has achieved and fulfilled the objectives and requirements as determined during analysis phase.

In the process of developing the system, invaluable insight was gained into complexities and intricacies of the programming language and system tools. The development schedule is very important in order to get a job done on time. Besides that, the application of

software engineering principles throughout development has served to further enhance the required skills for developing a sound system. This valuable experience will be very useful in future system development.

Although it is not a really complex system, the successful development of the e-payment system is the first step towards more comprehensive and innovative system development in future. The problems and experiences gained during the system development definitely provide the useful foundation in my future endeavors.

USER MANUAL

TABLE OF CONTENTS

PREFACE

Welcome to **Dealership E-Commerce (E-Payment System)**, your guide to access the e-commerce through the local host. In this guide, you will find out how e-payment system work and the integration between dealer section and customer section.

This document has 2 Chapters:

Chapter 1 guides you through the installation the **PHPTriad.** You will need to know the system requirement before you can commence on the installation.

Chapter 2 explains the basic feature of Dealership E-Commerce Package (E-Payment System) such as how to upload shipping method, payment method, view customer's details and etc.

WHAT IS DEALERSHIP E-COMMERCE PACKAGE

The Dealership E-Commerce Package (E-Payment System) is an e-commerce that provides dealer a full e-commerce Web site that complete with store back office, database, and payment system. Dealers who sign in for be a member can sell their own product beside our package.

Dealership E-Commerce Package (E-Payment System) is an online company that provides e-commerce Web site for dealer. It has many dealers in all over Malaysia. Dealers / E-agent is person between customer and the corporate who sell corporate products to customers. Dealers also sell their own products. Customers are person who visits dealer's web site to view or buy products from dealers.

The electronic payment system is designed to provide immediate gratification of the wants of customers by allowing them to purchase goods, as services as credit. In an e-payment transaction within the dealer and customer, the dealers validate the customer's signature by matching the one on the back of the payment against the one on the charge slip. Settlement is handled by merchant's bank. The dealer receives immediate confirmation of a transaction while submitting it for authorization through the merchant's bank private data network.

CHAPTER 1: DEALERSHIP E-COMMERCE PACKAGE (E-PAYMENT SYSTEM) SETUP

1.1 System Requirements

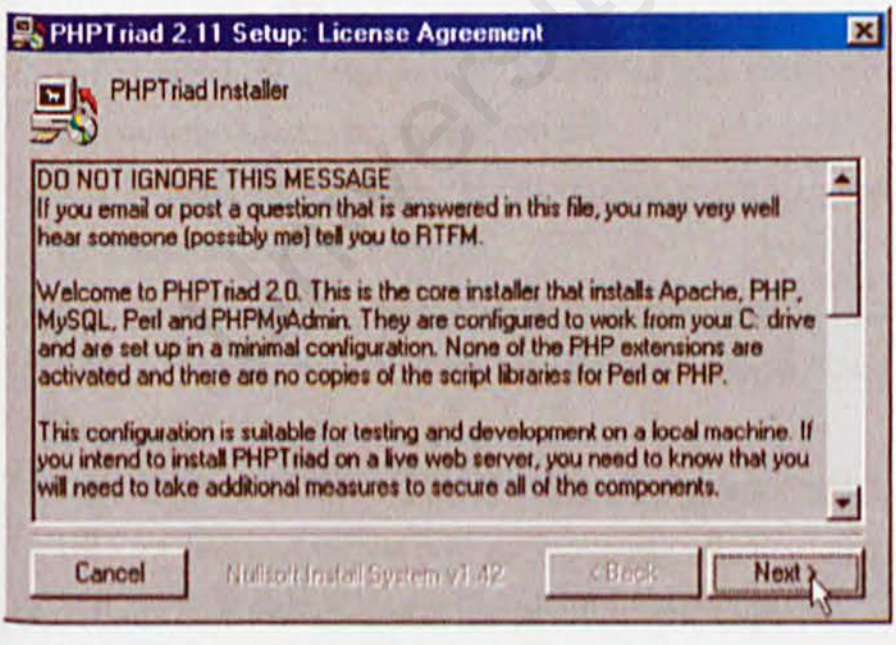
The following table describes the minimum requirements for installing and running PHPTriad.

Item	Requirements
Operating System	Windows 98
Applications	Internet Explorer 4.0 and above Netscape Communicator 4.0 and above
Hardware	Intel Pentium III Processor 128 MB Ram 5 MB hard disk space VGA monitor (Resolution 1024 x 768)

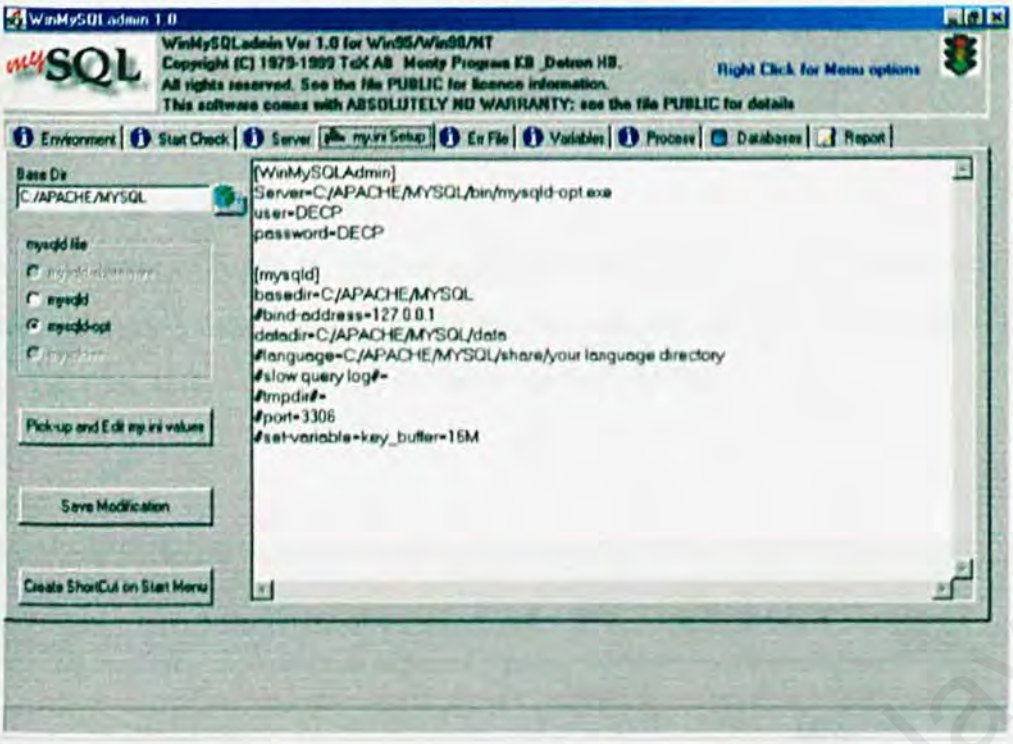
1.2 Running Setup

PHPTriad can be setup in the following manner:

1. Run the Application file of **phptriadsetup2-11** from CD.



2. Follow all the instruction of installing PHP Triad. Click **Next** button.



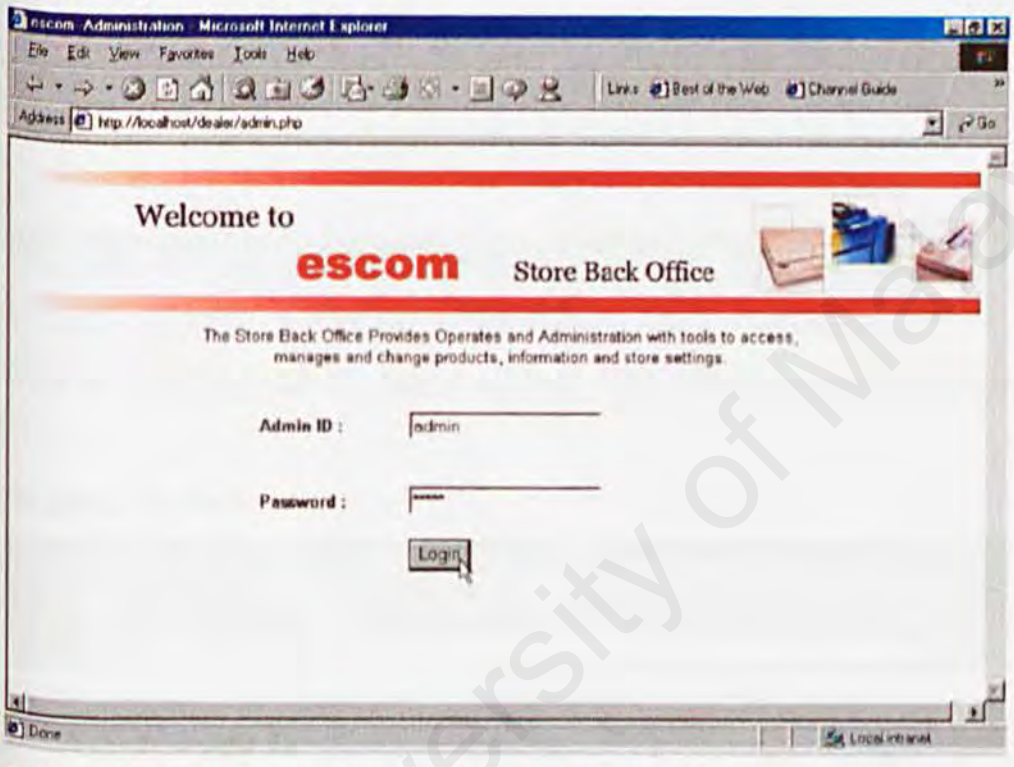
3. After install, go to **C → apache → mysql → bin**, click **winmysqladmin** application file to run the MySql admin site.
4. Set the user as "DECP" and the password as "DECP".
5. Open Coding folder from CD and copy the bank folder, customer folder, and dealer folder to **C:\apache\htdocs.**
6. Open Data Base folder from CD and copy the bank folder and dealer folder to **C:\apache\mysql\data.**
7. Go to **Start → Programs → PHPTriad** and select **Start Apache** from the programs list to start the Apache server.
8. Go to **Start → Programs → PHPTriad** and select **Start MySQL** from the programs list to start the MySQL.
9. URL for the MySQL is **http://localhost/phpmyadmin.**
10. Launch the Internet Explorer browser or Netscape Communicator browser to browser the site.
11. URL for dealer section is **http://localhost/dealer/admin.php.**
12. URL for customer section is **http://localhost/customer/index.php.**
13. URL for bank section is **http://localhost/bank/admin.php.**

CHAPTER 2: USING DEALERSHIP E-COMMERCE PACKAGE (E-PAYMENT SYSTEM)

2.1 Dealer Section

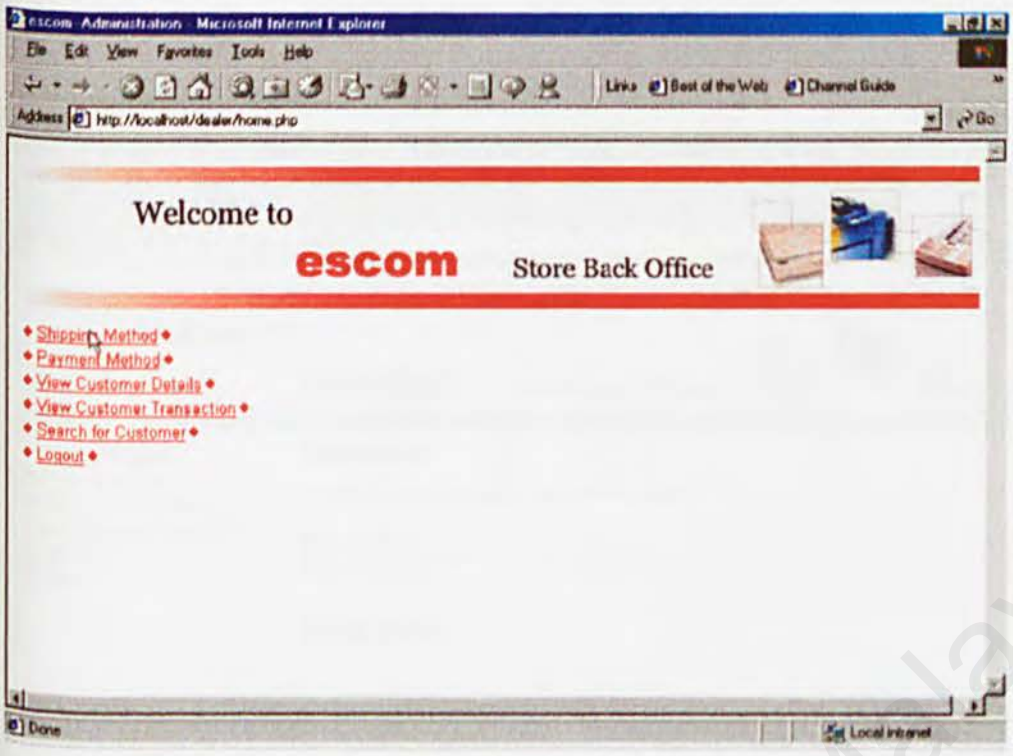
The store back office is for dealer login to modify the shipping method, payment method, view customer's details, view customer's transaction and search for customer. Dealer had to log in first before he can go into the store back office.

Login Page



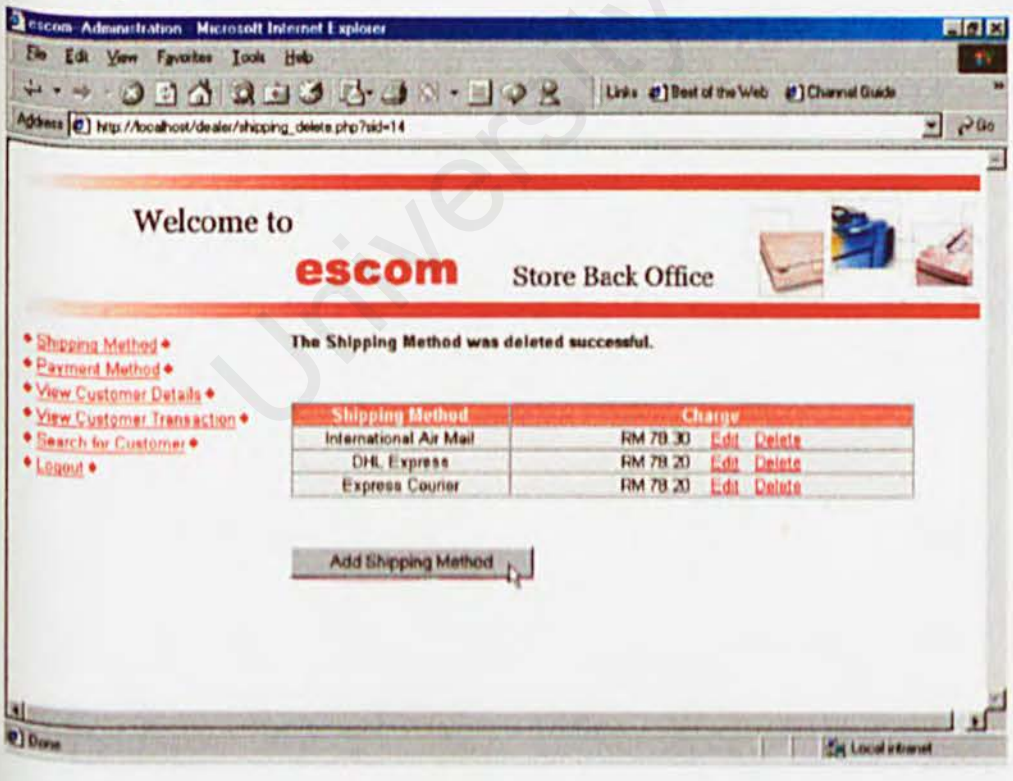
1. Go to the URL: **http://localhost/dealer/admin.php**.
2. Type in login name and password then click **Login** button. The login username and password is admin.

Home Page



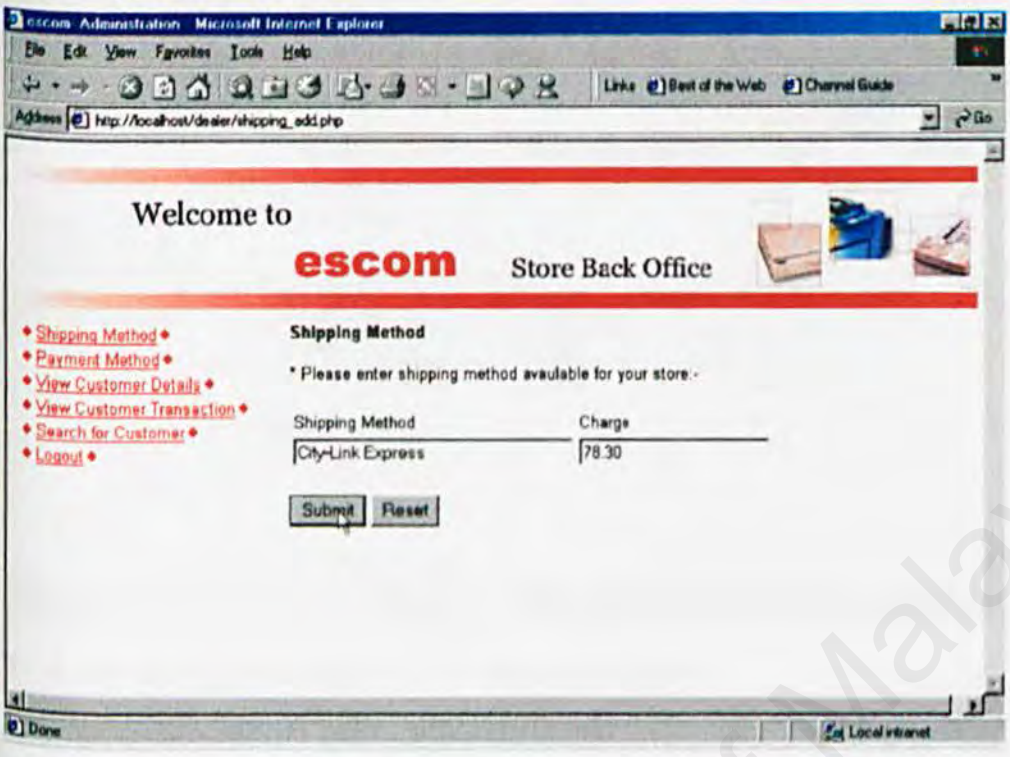
1. Dealer can click the link on the left menu to edit the information.
2. Go to Shipping Method. Dealer can Edit, Add, Delete the shipping method.

Shipping Method



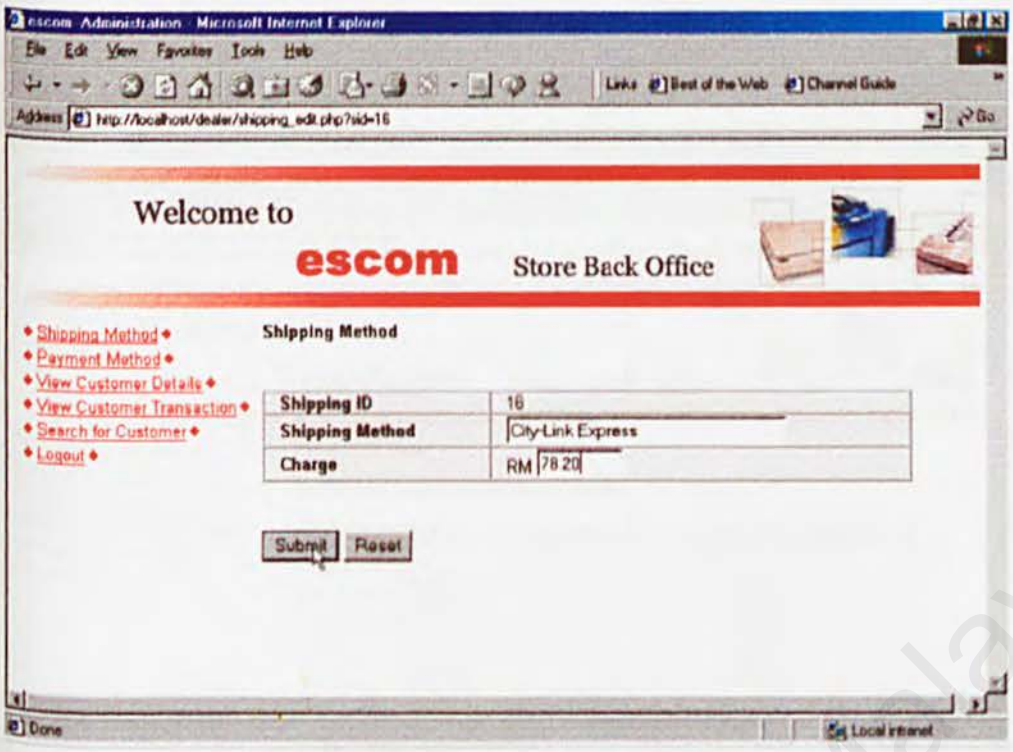
1. Click on the **Add Shipping Method** button.

Add Shipping Method



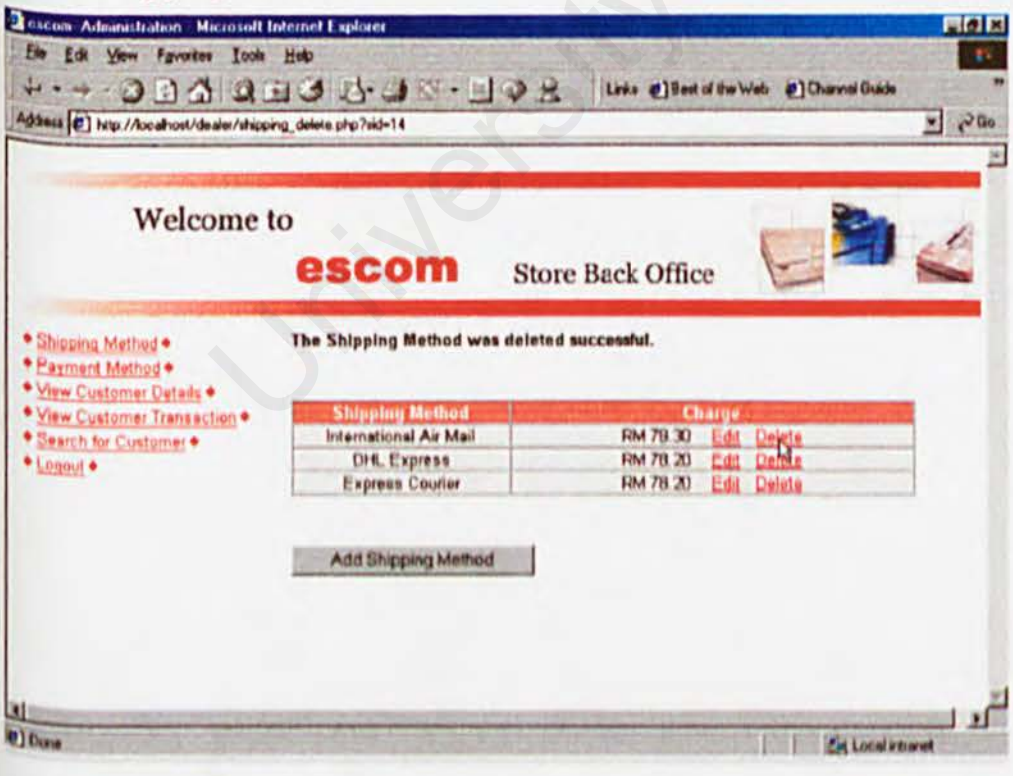
1. Dealer had to key in the shipping method and the charge for the shipping method.
2. Click **Submit** button if all the information is key in.

Edit Shipping Method



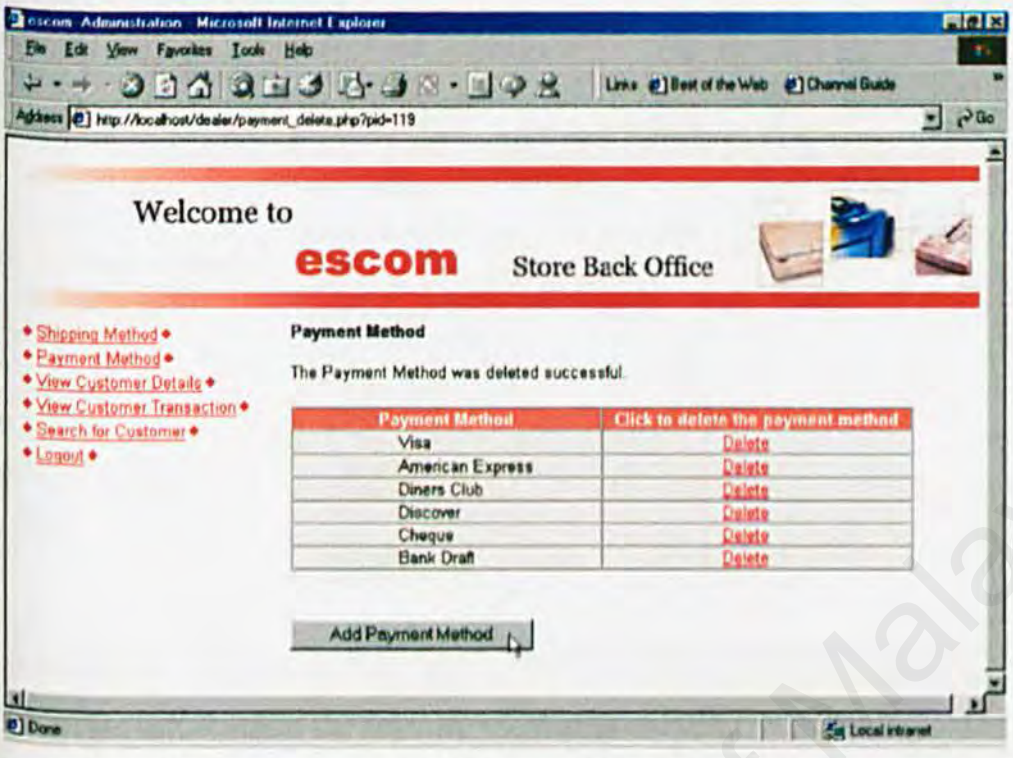
1. Dealer can edit the details of the shipping method.
2. Click on the **Submit** button after changing.

Delete Shipping Method



1. Dealer can delete all the details of the shipping method if he clicks on the **Delete**.

Payment Method

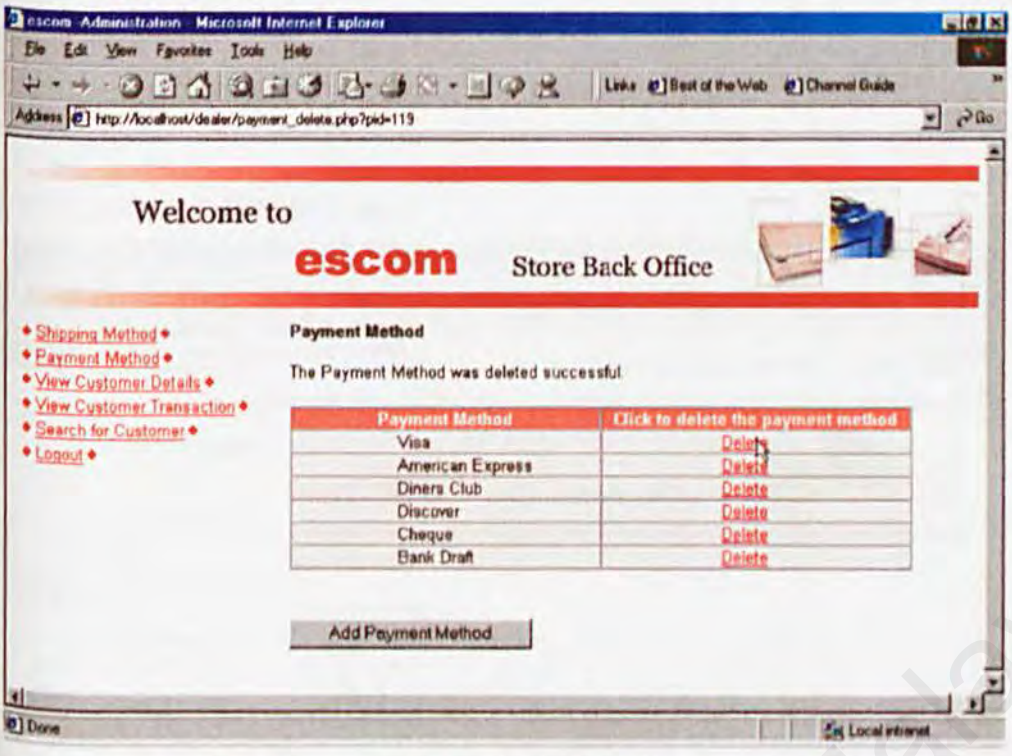


1. Dealer will go to Payment Method page if he clicks on the Payment Method link. Click on the **Add Payment Method** button in the Payment Method page.

Add Payment Method

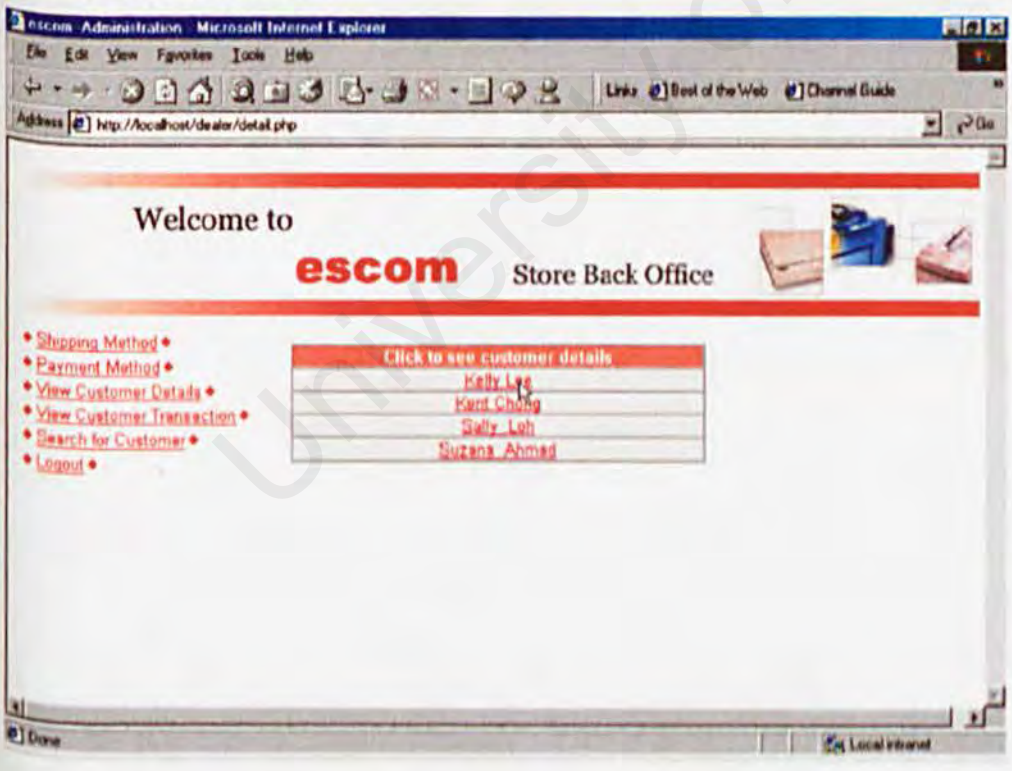
1. Dealer had to select the payment method in the list.
2. Click **Submit** button.

Delete Payment Method



1. Dealer can delete the payment method if he clicks on the **Delete**.

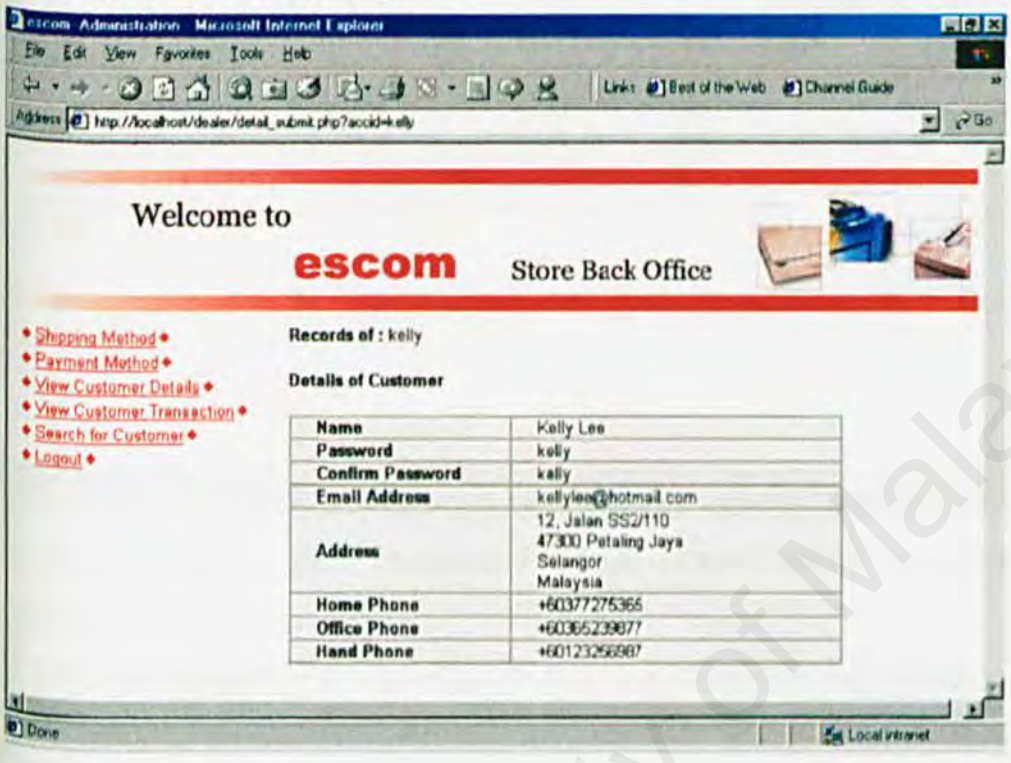
View Customer Details



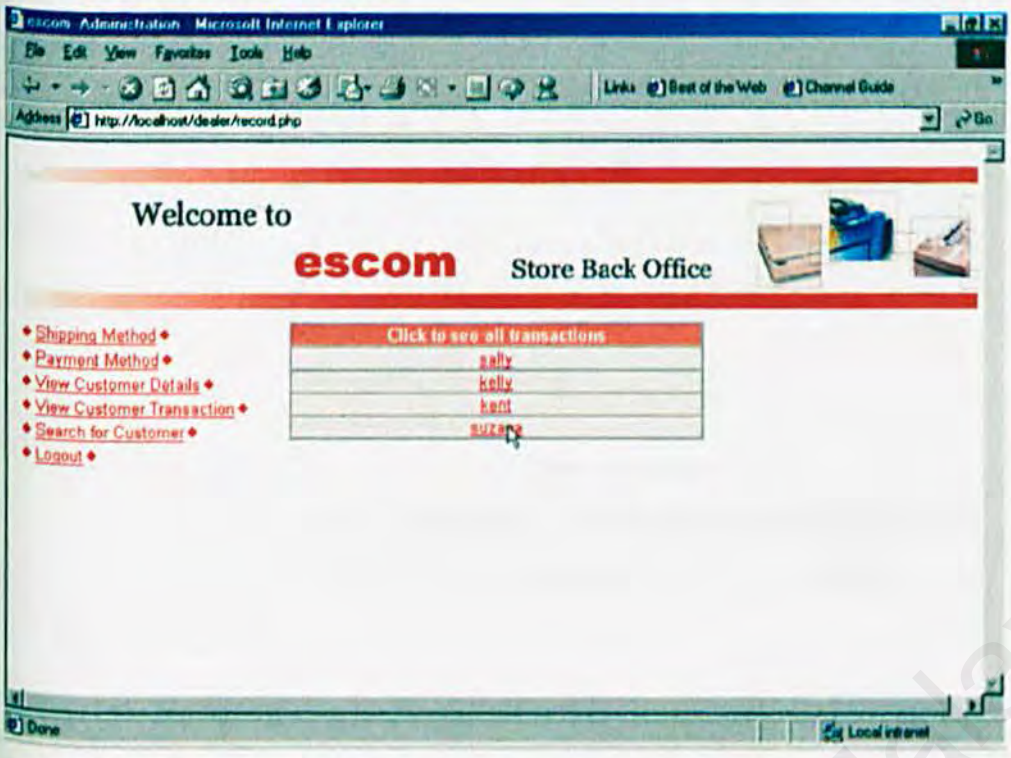
1. Dealer will go to View Customer Details page if he clicks on the View Customer Details link at left menu.

2. Click on the customer's name link to view the customer's details.

View Customer Details Page



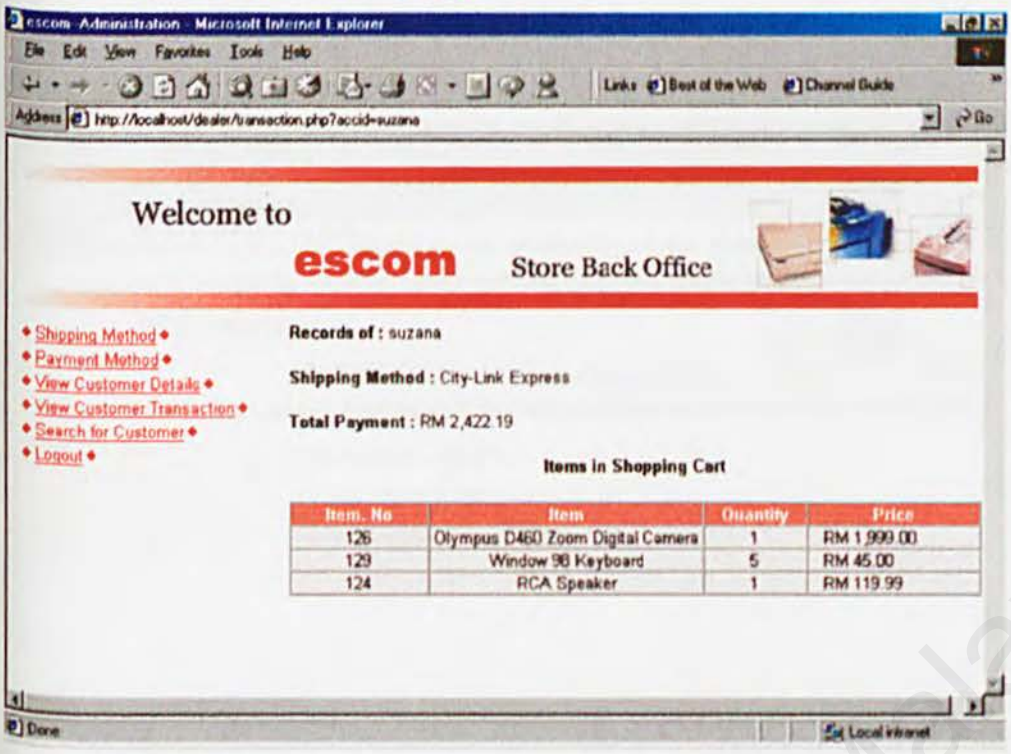
View Customer Transaction



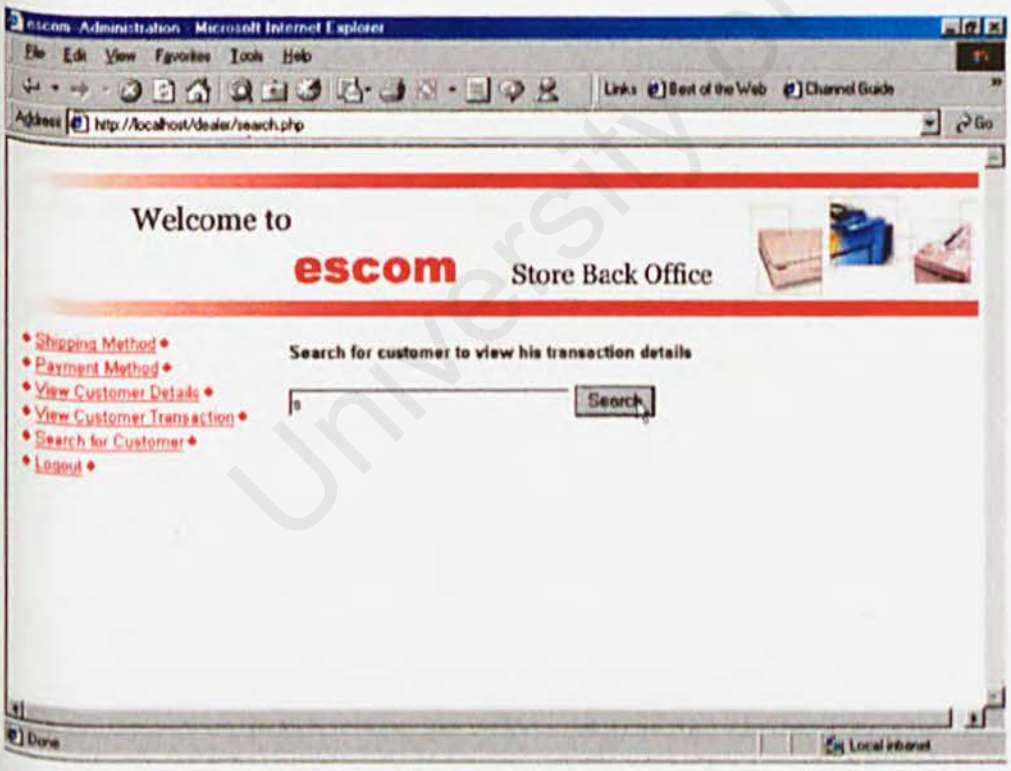
1. Dealer will go to View Customer Transaction page if he clicks on the View Customer Transaction link.

2. Click on the customer's name link to view the customer's transaction.

View Customer Transaction Page



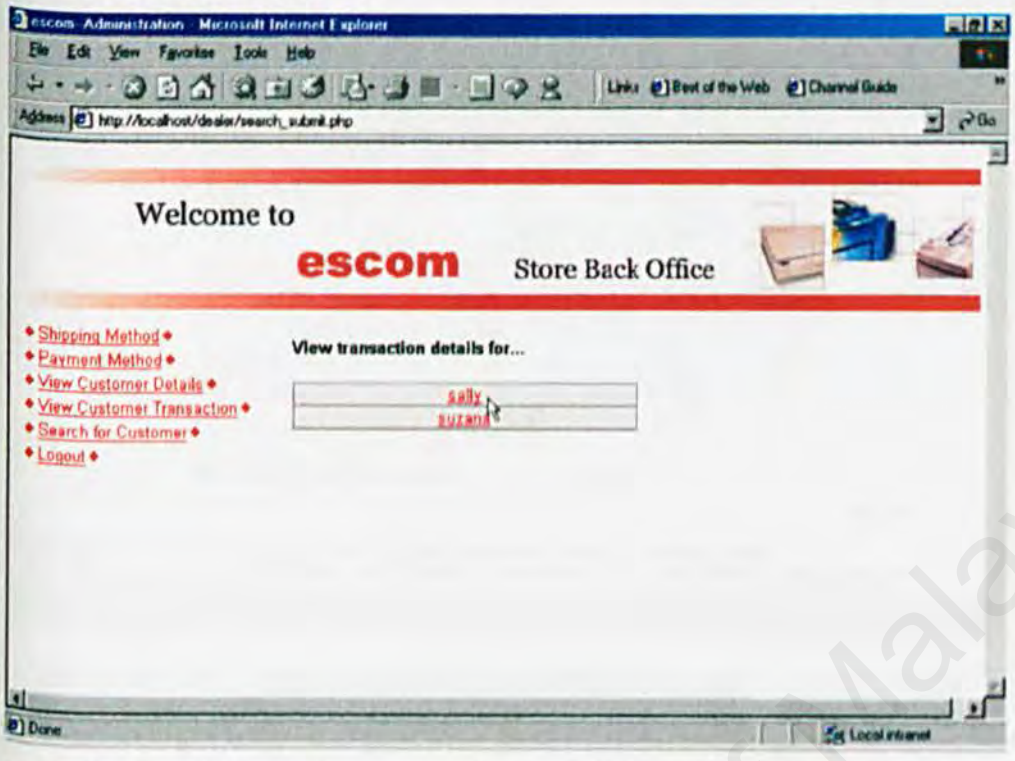
Search for Customer



1. Dealer will go to Search for Customer page if he clicks on the Search for Customer link.
2. Dealer can type in the keyword to search the customer.

3. Click on the **Search** button.

Result of Search Customer

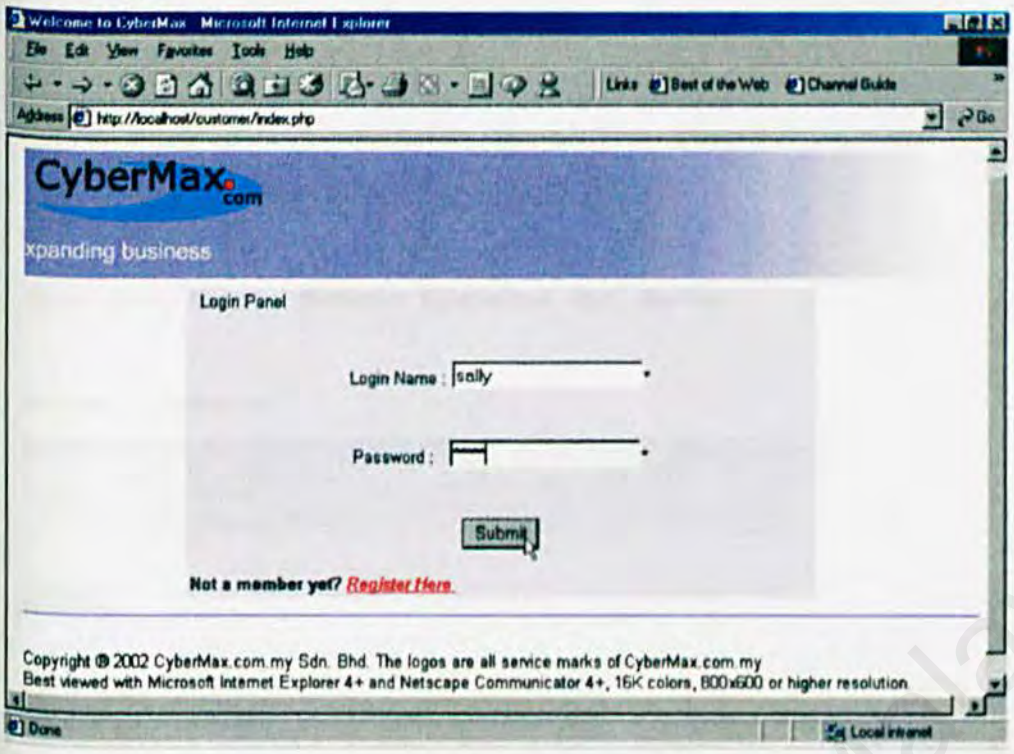


1. Dealer can click on the customer's name link to view the transaction.

1.2 Customer Section

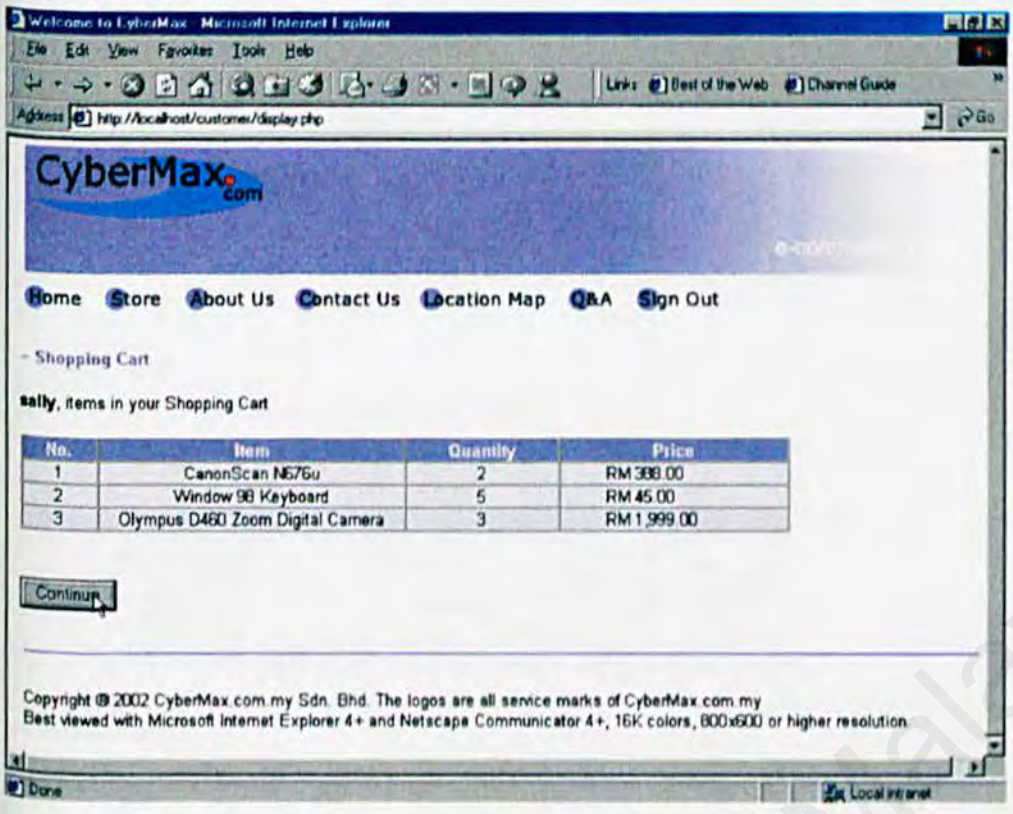
In the store front office, customer had to log in before he can do the shopping.

Login Page



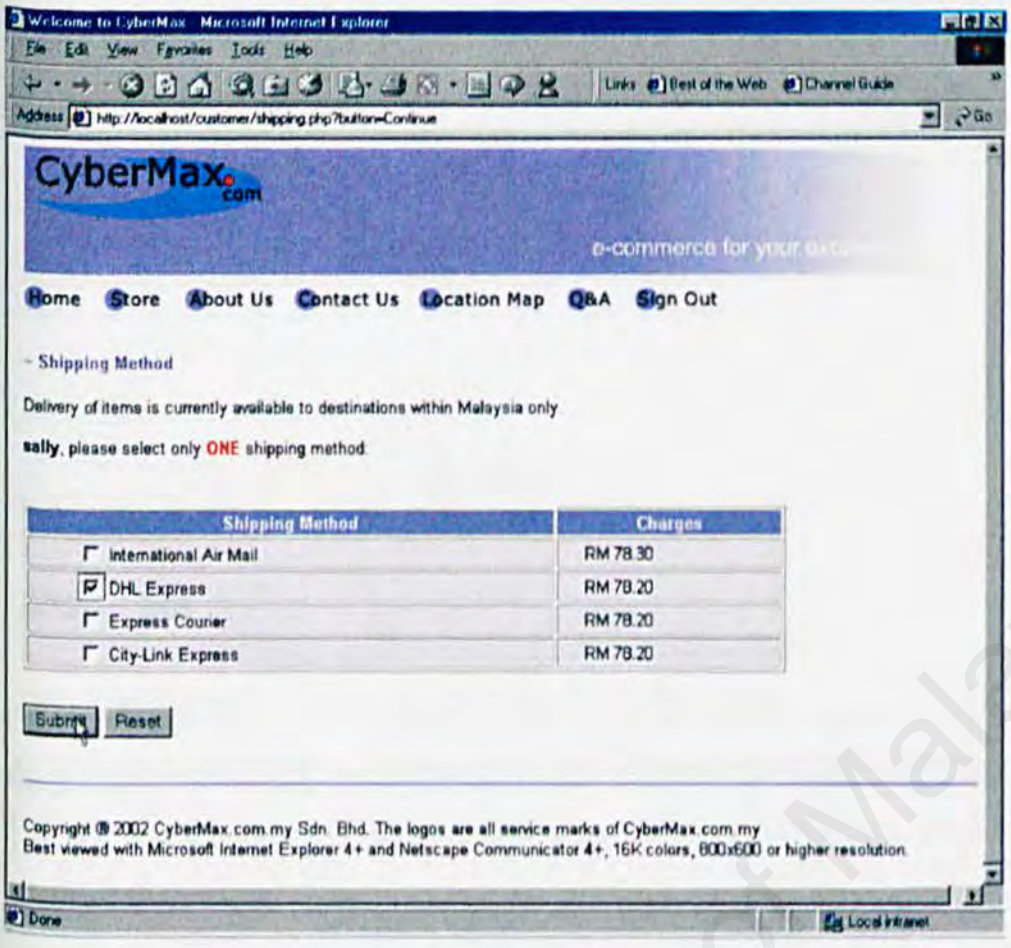
1. Go to the URL: **http://localhost/customer/index.php**.
2. Type in login name and password then click **Submit** button.

Display Page



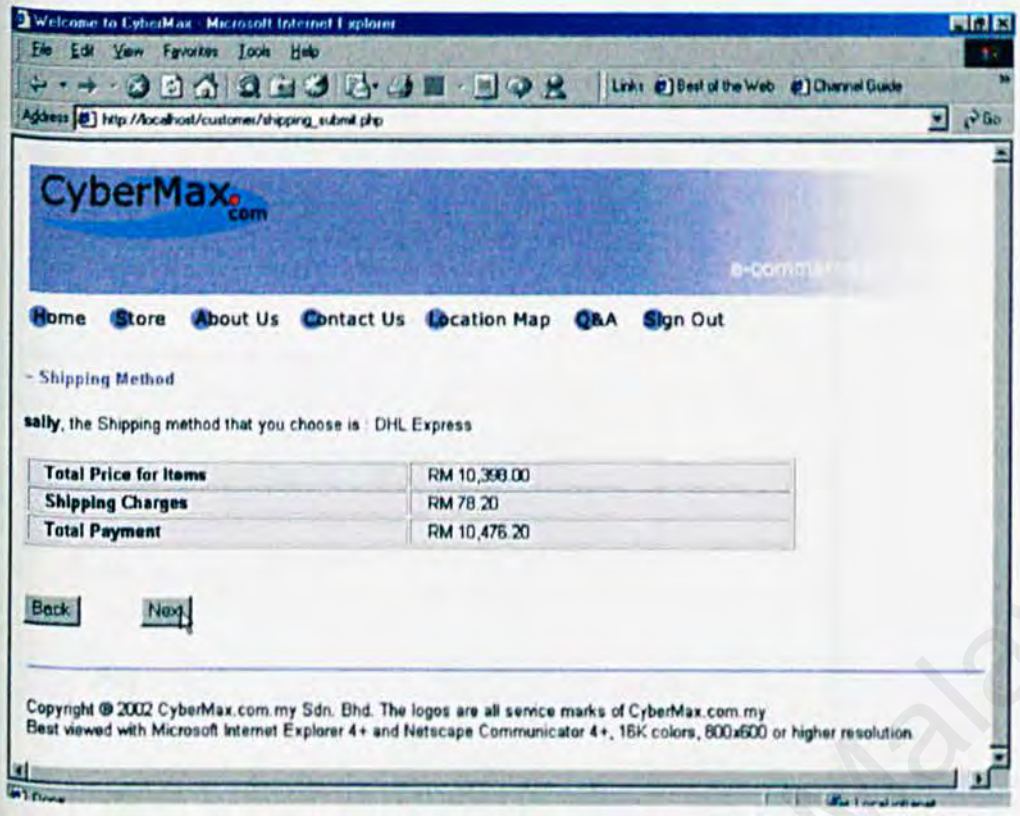
1. Click on the **Continue** button.

Shipping Method Page



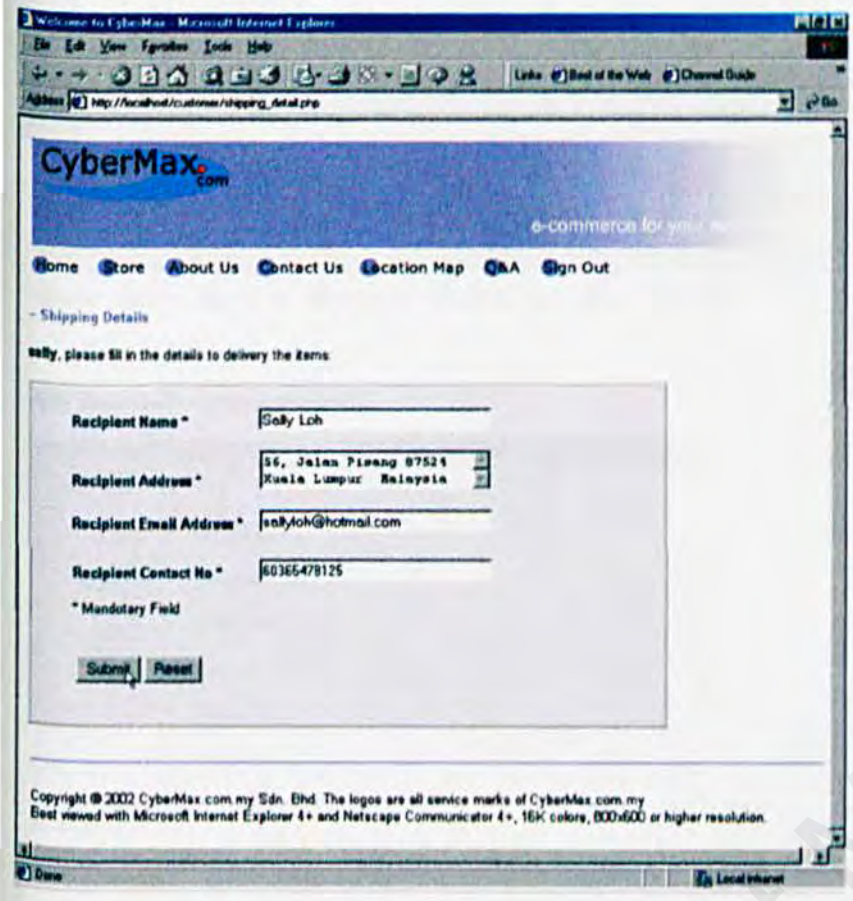
1. Choose the shipping method and click **Submit** button.

Shipping Details Page



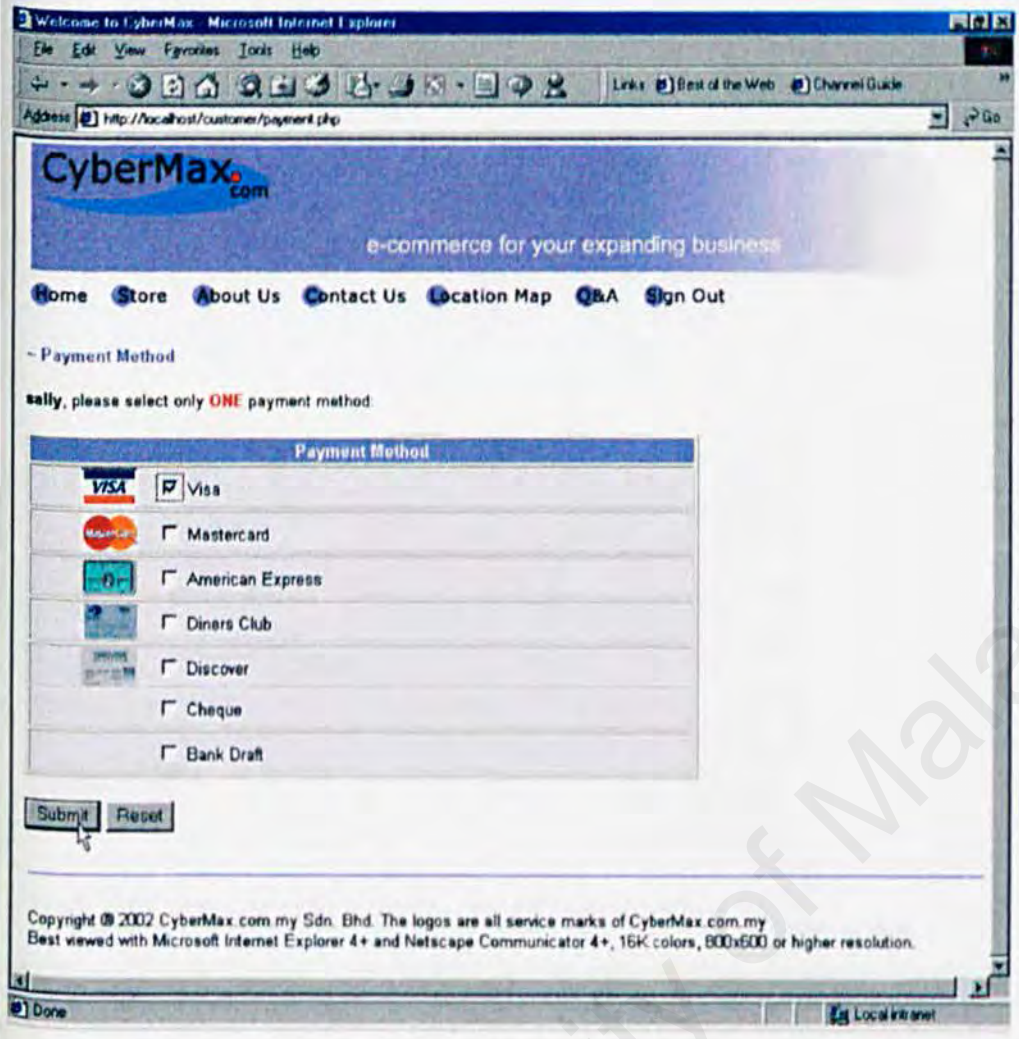
1. Click **Back** button if you want to change the shipping method or click **Next** button to continue the process.

Recipient Details Page



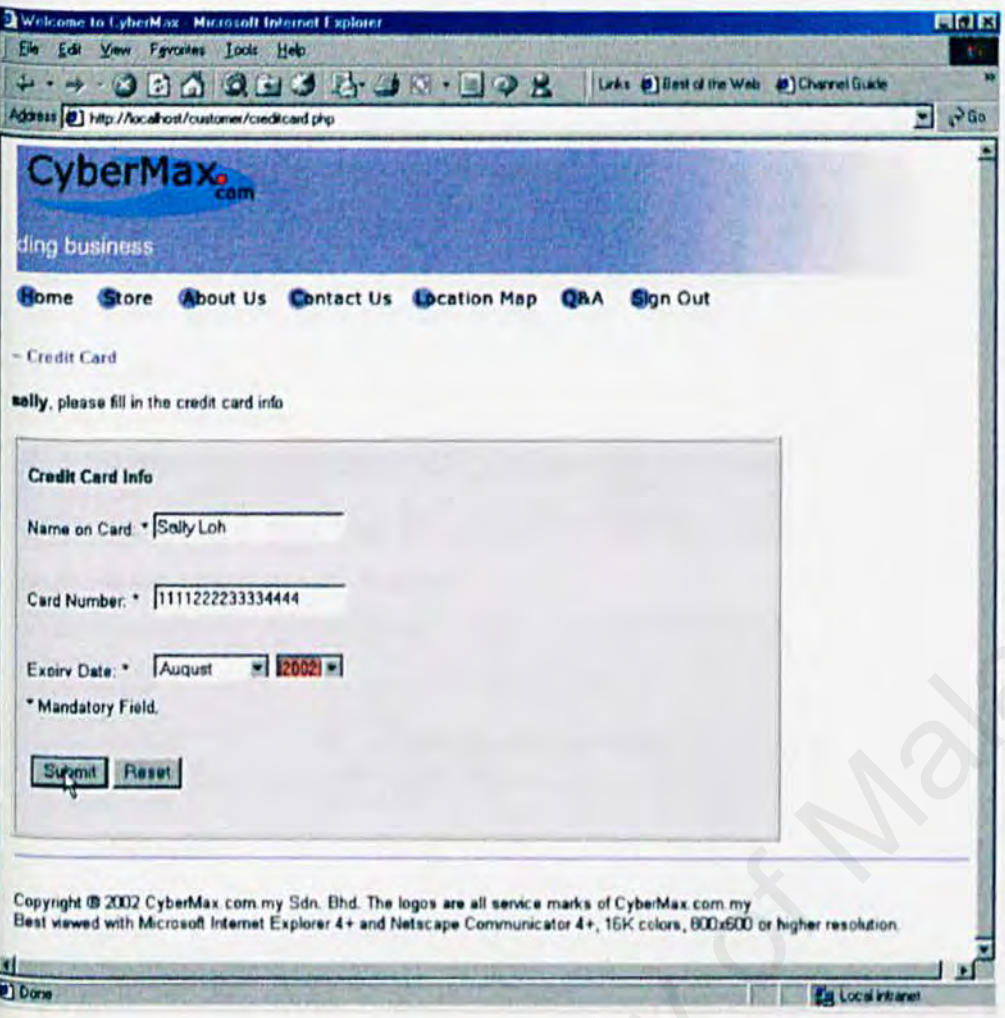
1. Fill in all the details for delivery the items.
2. Click **Submit** button.

Payment Method Page



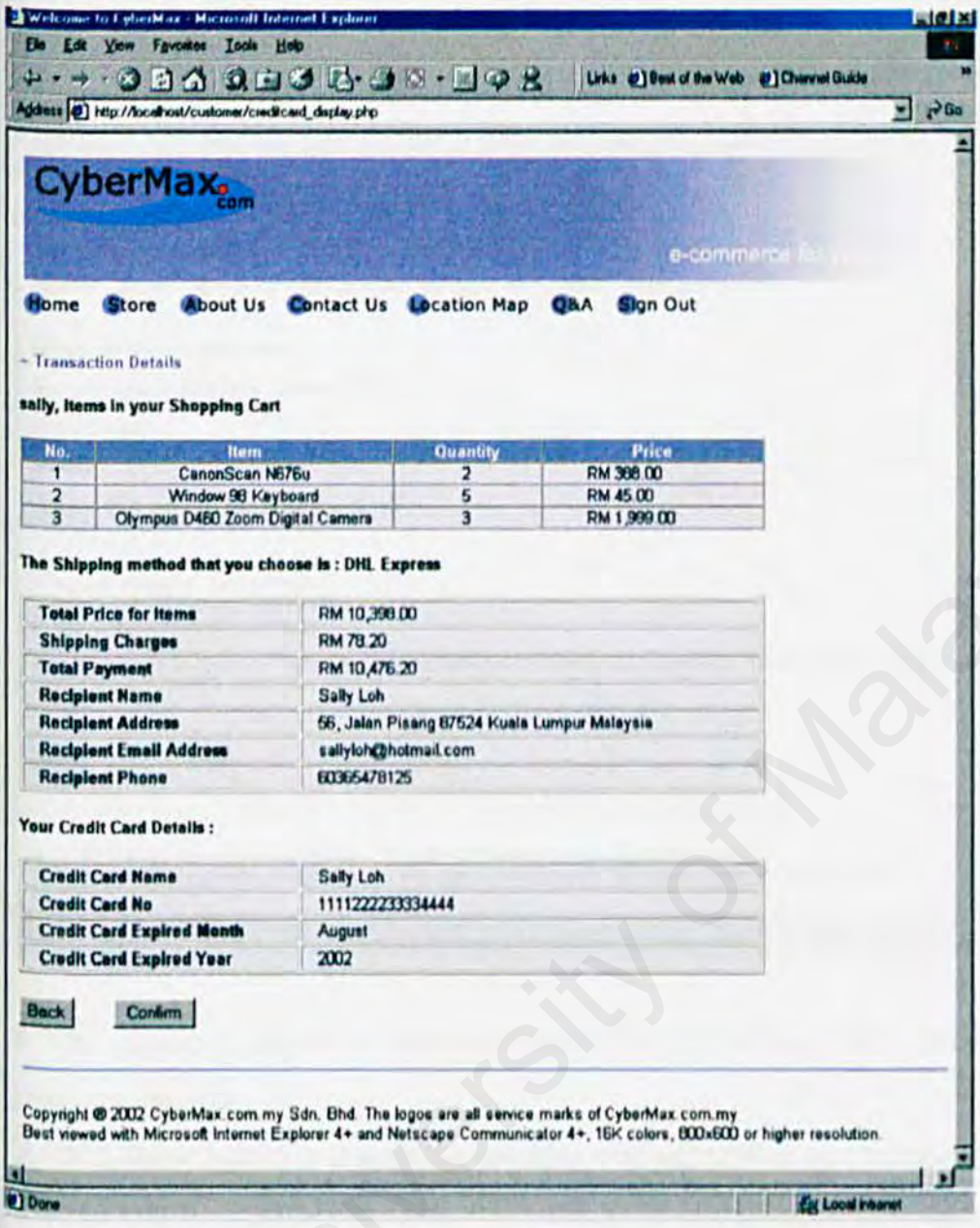
1. Select the payment method and click **Submit** button.

Credit Card Info



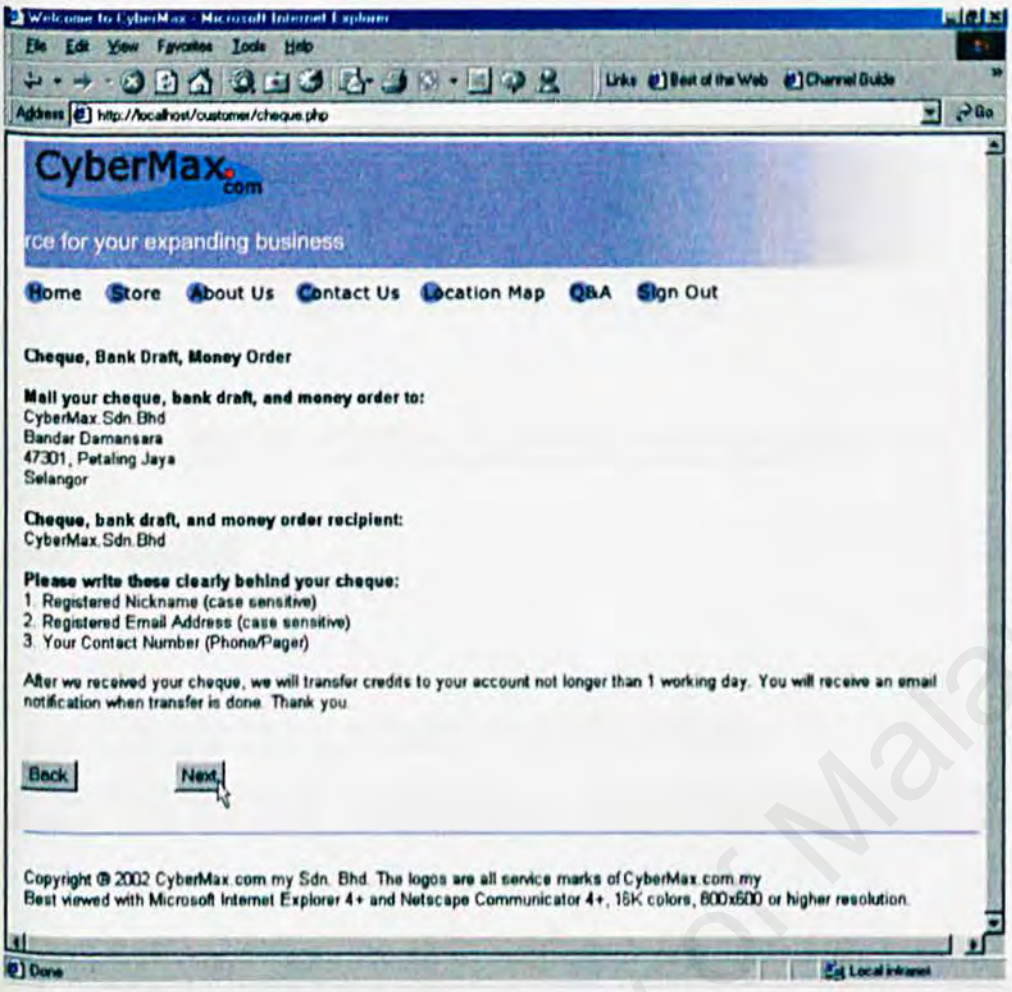
1. Customer had to fill in the information of the credit card if he chooses the credit card as his payment method.
2. Click **Submit** button.

Customer Transaction Page



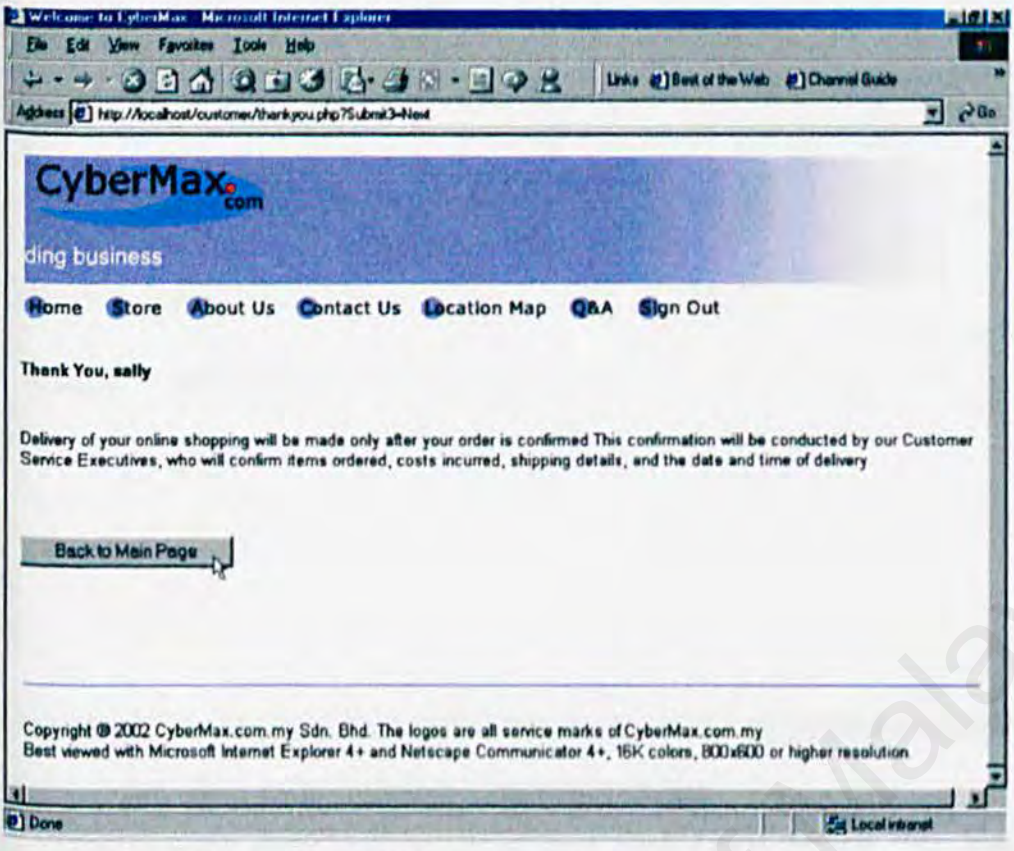
1. Click on the **Confirm** button to continue the process or **Back** button to change the payment method.

Cheque Page



1. This page will display if customer choose cheque, or bank draft, or money order as his payment method.
2. Click **Back** button to change the payment method or **Next** to continue the process.

Thank You Page



1. This page will display if all the transaction is confirm.

2.3 Merchant Bank Section

The administrator in the merchant bank can view the customer's account.

Login Page

1. Go to the URL: **http://localhost/bank/admin.php**.

2. Type in login name and password then click **Login** button. The login username and password is admin

Home Page.

1. Dealer can click the View Customer Account button to view the customer's account.

View Customer's Account Page

1. Click on the customer's name link to view the customer's account.

Customer's Account Page

REFERENCES

1. e-commerce

URL : http://www.allec.com/

URL : http://ecommerce.internet.com/

URL : http://www.cnet.com

URL : http://cism.bus.utexas.edu/

URL : http://www.tandem.com

URL : http://www.stratus.com

2. e-commerce tutorials

URL: http://webopedia.internet.com/Internet_and_Online_Services/Electronic_Commerce/

3. Secure Sockets Layer (SSL)

URL : http://developer.netscape.com/tech/security/ssl/protocol.html

URL : http://www.netscape.com/security/index.html

4. Secure Electronic Transaction (SET)

URL : http://psych.psy.uq.oz.au/~ftp/Crypto/

URL : http://www.setco.org/

5. Public-key Cryptograph

URL : http://www.entrust.com/

URL : http://www.cse.dnd.ca/

6. Digital Signatures

URL : http://www.elock.com/

URL : http://www.digsigtrust.com

7. Digital Certificates

URL : http://www.verisign.com/

URL : http://www.belsign.be/

URL : http://www.certco.com/

8. Digital Wallet

URL : http://www.trintech.com

URL : http://wallet.yahoo.com

9. Apache Web Server

URL : http://www.apache.org

10. MySQL

URL : http://www.mysql.com

11. SQL tutorial

URL : http://w3.one.net/~jhoffman/sqltut.htm

12. PHP

URL : http://www.php.net/

13. Gayle Coffman, SQL Server 7.0: The Complete Reference, McGraw-Hill 1999

14. H.M Deitel, P.J.Deitel, T.R.Nieto, Internet And World Wide Web How To Program, Prentice Hall 2000

15. Jesus Castagnetto, Harish Rawat, Sascha Schumann, Chris Scollo, Deepark Veliath, Professional PHP Programming, Wrox Press Ltd, Feb 2000.